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Air-Cooled Storages for Apples

by Roy E. Marshall
Michigan Agricultural College

IN THE January number of the AMERICAN FRUIT GROWER MAGAZINE, Prof. V. R. Gardner presented data showing that there is a fairly constant and uniform monthly consumption of apples during the autumn, winter and spring months in such cities as Detroit and Grand Rapids. Prof. Gardner then pointed out that it was good merchandising on the part of the apple grower to see that the consumer gets good apples when he wants them.

Michigan apple growers have been shipping 96 per cent of the total carlot movement of apples before the end of November. This heavy shipment, during and immediately following harvest, has been necessary because of the negligible amount of cold storage space available for apples at points of production. This situation will probably eventually be remedied by providing public storage for at least 2,000,000 bushels of apples at points of production. These public storages will slowly but gradually become realities. In the meantime, the fruit grower who markets his apples locally should be provided with an inexpensive but efficient storage. The cost of building and operating a mechanically refrigerated cold storage of 5000 to 20,000 bushels capacity is too high per bushel or per barrel. Consequently, attention has recently centered about the so-called common or air-cooled storage as one which may be erected at reasonable cost and operated by the fruit grower or his usual help at a low cost per unit of storage space.

Renewed Interest in Michigan

A general survey of the storage situation in Michigan was made two years ago and a half dozen common storages were found on the farms of commercial fruit growers, most of which were partly underground basements of buildings, the upper portions being used for various other purposes. The fruit kept fairly well in most of them. One storage was found, however, which seemed to stand in a class by itself. It seemed to be ideally planned, although the owner had never seen nor read descriptions of air-cooled storages. This storage has paid for itself in each of three seasons and, of course, has paid for itself several times over during the 10 years of operation. Fruit has been held in a merchantable condition until April and May and there have never been any losses whatever from freezing or from shriveling of the apples.

This storage made us confident that properly constructed and properly operated air-cooled storages would meet with success in Michigan in spite of the warm weather which usually prevails during a considerable portion of the picking season. During the summer of 1922, two new storages were constructed and during 1923 there were 15 built or rebuilt according to suggestions and advice furnished by the Michigan Agricultural College. No two of these storages have been built alike but all are giving satisfaction. The Department of Horticulture ascertains the fruit grower's preferences as to building materials and then gives advice accordingly.

Storage Must Provide for Cooling, Insulation and Humidity

An air-cooled storage must provide, first, for the intake of a large volume of cold air which must come in con-

this cold air (by means of insulation) at times when the outdoor temperature is warmer than that inside, or vice versa, when the outdoor temperature is below freezing; and third, for

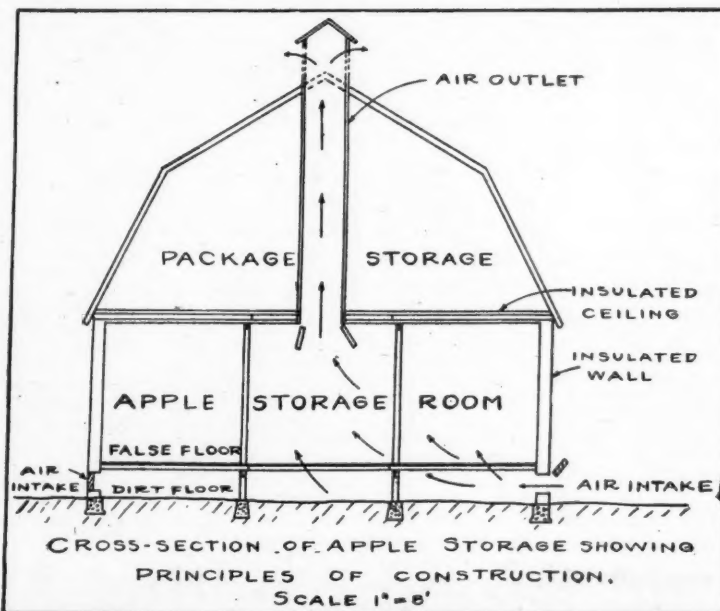


Figure 1—Diagram of an apple storage house, showing ventilation system for cooling, and dirt floor to provide proper humidity.

tact with all fruit containers and in turn be passed out of the room after it has absorbed some heat from the fruit; second, for the conservation of a relatively high degree of humidity to prevent shriveling of the apples. The cross-sectional diagram shown in figure one illustrates the principles

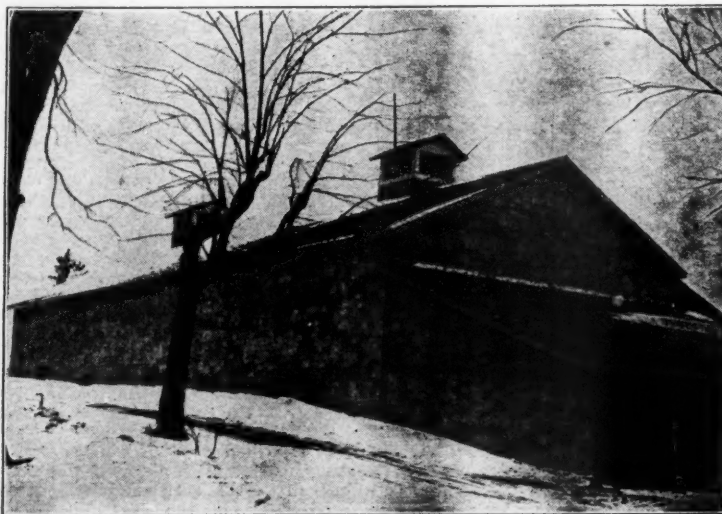


Figure 2—This 13,000-bushel air-cooled storage of J. P. Keeney & Son, Lennawee County, Mich., has thirteen 18 by 30 inch cold air intakes and two four by four foot outlets or ventilators. The walls are constructed of interlocking tile.

involved in an air-cooled storage. There is no hard and fast rule to follow with regard to the insulation of the walls and ceiling except that they must be so insulated that none of the apples will be frozen during the coldest weather that may reasonably be expected. If the building is to be of frame construction, it may be sufficiently insulated by using several layers of boards and water-proof building paper with air spaces between each layer, but such construction is expensive. It is preferable to use boards, building paper, air space and some such material as "celotex," both outside and inside the studs. Or, boards and paper may be used outside the studs and boards, with one inch of hair felt and paper inside the studs. Another method is to fill the space between the studs with "insolux," using paper and boards or water-proof plaster or stucco outside and inside the studs. The old system of using dry mill shavings, which are relatively cheap, is used by some and is a satisfactory method of insulating frame storages. The ceilings may be handled in a similar manner.

Frame construction is not as popular as masonry because of the danger of fire, because of the short life of the wood when exposed to the high humidity that must exist in the storage room, and because more trouble is experienced from rodents. Concrete is a very poor insulation material and therefore a wall made of concrete must be necessarily thick and well water-proofed to prevent freezing in the coldest weather, unless the walls are below the ground line. Concrete blocks with air spaces in the blocks may be used provided two distinct walls with an air space between them are built, or one concrete block wall may be built and some material like celotex (two layers with an air space between them), insolux, hair-felt or cork may be used inside the supporting wall.

The storage previously referred to in this article is constructed of two distinct walls of glazed hollow tile, the outer wall being eight inches in thickness and the inner one four inches. There is an inch space between the two walls and in this space is a quarter inch quilt made of two thicknesses of paper with dried seaweed as filler. Below the joists are paper, boards, a half inch air space and then wood pulp plaster. Above the joists are two thicknesses of boards with water-proof paper between them. The storage shown in figure two consists of a 12-inch interlocking tile wall with water-proof plaster on the inside and stucco on the outside. There are five small air spaces between the inside and outside of this wall. The principal insulation in the ceiling is an inch layer of hair felt below the joists. A special wall board is below the hair felt and above the joists are paper and boards.

Air is of little value as an insulator unless it is confined; thus the smaller the air spaces and the greater the number of them, the better will be the insulation. Vertical air spaces, such as may exist in walls of frame construction, permit convection cur-

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Raspberry Troubles

by H. W. Anderson

University of Illinois

"RASPBERRY" is probably derived from an old English word "razz," meaning to torment or trouble. The raspberry grower of today is being "razzed" by so many troubles that he is becoming thoroughly discouraged and would give up the growing of this crop were it not for the fact that the financial returns are exceptionally large when he is lucky enough to get a crop.

Fruit growers are well acquainted with the fact that today fruit cannot be raised as it could be by our grandfathers without spraying or other care. With other fruits we are familiar with the agents which cause the diseases, which are in turn responsible for the poor yield of fruit on neglected trees or vines. These agents are well known insects and fungous parasites. But in the case of raspberries, the cause or causes for the poor yield of fruit and the "running out" of the plantations are more mysterious, and even the expert horticulturist and plant "doctor" of the Federal Department of Agriculture and the State Experiment Stations are puzzled by the conditions now existing. It is the purpose of this article to describe some of the more obscure of these maladies of the raspberry and give some suggestions as to how they may be controlled.

Fungous and Bacterial Diseases

Before describing the disease of mysterious origin mentioned above, it might be well to describe, briefly, a few of the more familiar troubles of the raspberry. Crown gall is the most destructive disease of raspberries. The large rough galls produced in this disease and found on the canes and roots are familiar to most raspberry growers. The affected plants never recover and the disease spreads rapidly through the plantation. The canes are frequently weakened near where they join on the main root stalk and break off in windstorms. Anthracnose is another serious disease. The evidence of this malady is best seen on the canes just above the ground line as small, oval greyish spots which, when abundant, cause serious splitting of the bark. This disease may cause serious loss in a dry season by weakening the canes to

such an extent that the berries do not attain normal size and frequently wither before ripening.

Other fungous diseases, such as leaf spot, cane blight and spur blight, may, at times, cause serious losses but as a rule they are of minor importance.

Weather Injury

While hardy under ordinary conditions, the raspberry is often seriously weakened by severe or abnormal winters. This is frequently evident in the spring, when many of the tips of the canes are killed back a foot or so. If one examines the canes back of this point, there will be found evidence of injury even though the leaf and fruit clusters seem to start development in a normal manner. Later in the season the leaves are observed to suddenly wilt and the half grown berries cease development and finally wither.

Three Strange Diseases

Many plants suffer from diseases of peculiar nature and unknown cause. They are grouped under the general terms "mosaic," "yellows" and "leaf curl." The raspberry is afflicted with more than its share of these types of disease. Three diseases known as mosaic, leaf curl and eastern blue stem are known to occur on raspberries in the eastern half of the United States. These diseases are alike in that they are all infectious and can be transmitted from plant to plant. They are also systemic, that is, they are in the "system" of the plant, and since new canes originate from the old by either stolens or root "suckers," the disease passes from the canes of the current year to those of the following season. While the casual agents of the disease have never been isolated, many facts are known concerning their nature. We may compare them with smallpox in man and the foot and mouth disease in cattle since these are also produced by a so-called filterable virus.

Leaf Curl

This is a disease of the red rasp-

berries. As its name indicates, the leaves are curled and dwarfed. The veins of the leaflets are arched downward and the leaf tissues appear to be "puckered" or "gathered" along these main veins. The edges of the leaflets turn down and often the tip is curled under. The diseased canes are dwarfed to a marked extent, especially after the disease has been established for several years in a plantation. At first the leaf color is a darker green than that of the normal leaves, but later becomes yellowish or bronze colored. This disease does not spread rapidly through a plantation but once established, it gradually increases in extent until after a few years perhaps 20 per cent of the plants are involved. The diseased plants always give rise to diseased canes in the second season. In addition to this method of dissemination, certain plant lice or aphids carry the infectious material from diseased to healthy plants and thus start new areas of infection.

Mosaic

This disease is found on both the red and black varieties. In Michigan it is mainly on the blacks, while in New York it seems to be more abundant on the reds. As one looks over a field where this disease occurs, certain areas are observed where the plants appear to be "off color." Closer observation shows the canes in these areas to be much more slender than normal canes. The leaves on these plants are small and show a decided mottled appearance. Certain areas on the leaf blades of new canes are arched upward and are blister-like in appearance. These areas may be a quarter to an inch in diameter.

The fruit produced on diseased canes is seedy and of little value. This disease travels up and down the row so that long areas in a row may show symptoms varying from a severe condition in the center of the area to almost normal plants at either end. Mosaic, like leaf curl, is systemic and passes from plant to plant

through the underground root stalk. It is, of course, transferred to new plantings when diseased plants are dug up in the old plantation. It is also probably transmitted by insects, such as aphids.

Eastern Blue Stem

This disease is of recent origin, or at least has been definitely established as a separate disease within recent years. It affects the black raspberry only and Cumberland, Plum Farmer, Kansas and Hoosier are regarded as most susceptible; but this list of varieties may be further extended when the disease becomes more generally known.

Eastern blue stem is so called because the diseased canes often show peculiar elongated blue or violet mottled streaks from the ground line to about 18 inches or two feet above this line. The stripes are about as broad as a pencil mark but are rarely continuous, that is, they resemble a series of short, interrupted marks. These marks are sometimes inconspicuous or lacking even when the other symptoms indicate the true nature of the disease.

Diseased canes are dwarfed or stunted and the leaves are closer together than on a normal shoot. The tips of the leaflets turn down sharply but the edges of the leaflets are not turned downward as in the case of leaf curl. The leaves are frequently mottled, showing small yellowish-green areas over the surface.

Blue stem is systemic in nature and all shoots derived from a diseased plant become diseased. Tips planted from diseased plants are stunted and frequently fail to develop.

The berries on diseased plants are lacking in flavor and the harvest season is shortened. Usually canes developed from diseased plants are so weak that they die out during the winter or succeeding summer before fruiting. From two to three years is the average life of the plant after the disease becomes established.

Control of the Various Diseases

Spraying is of no value in the control of the three "virus" diseases described above. It is possible that a

(Continued on page 9.)

Second Brood Codling Moth

by W. P. Flint

THE QUESTION is frequently asked by orchardists, which is the most destructive, the first or second brood of the codling moth? It is impossible in most cases to give a definite answer to this question, as so much depends on the location of the orchard, the weather of the season, and the variety of apples being grown.

Throughout the main apple growing sections of the Mississippi valley, there is one, and a partial second brood of this apple pest, and south of a line drawn from La Fayette, Ind., Urbana, Ill., and Hannibal, Mo., there is a partial third brood in most seasons.

During years with dry, hot summers following early springs, the second brood codling moths may be sufficiently abundant to destroy 50 to 90 per cent of the apples in the unsprayed, or poorly sprayed, orchards. This brood of the codling moth has been the most troublesome in Illinois orchards for a number of years. The first brood codling moth usually appears at a pretty definite time in relation to the appearance of the bloom on the trees, although this is not always the case. At the time when the eggs of this brood are hatching, which is usually from 10 days to three weeks after the fall of the petals, it is necessary to apply sprays for the control of apple blotch and scab, and for this reason, this brood of the codling moth is usually pretty well taken care of.

The time of the appearance of the second brood worms depends very largely on the weather of the season,

and may vary from year to year over a period of nearly three weeks. Any orchardist can ascertain for himself the time of the appearance of this brood of the codling moth in his orchard. This may be easily done by banding a few unsprayed apple trees during the first part of June. The best band for catching the codling moth larva is a strip of ordinary tar building paper, six inches wide, placed tightly around the trunk of the tree just below the lower branches, and fastened with a large bill poster's tack.

In southern Illinois, one should begin examining these bands by the first of June; in central Missouri, Illinois and Indiana, by the tenth to the fifteenth of June. Look under the bands at three-day intervals and pick out the codling moth larvae which have collected under the bands. Drop these into a large mouthed bottle containing half a dozen strips of corrugated paper cut in lengths of four to six inches long and one-half inch wide at right angles to the corrugations. Allow the worms to remain in the bottle for two or three hours, by the end of which time nearly all of them will have crawled into the little cells in the corrugated paper strips. Then carefully remove the strips from the bottle and place them in a mason jar, putting on the lid, but not screwing it down so that it will be air tight. Set the jar in the fork of the tree in the orchard

where the sun does not shine directly on it, and watch it carefully for the appearance of the first moths. This will indicate when the moths will be out in the orchard. The moths usually start laying their eggs the second day after emergence, and at this time of the year, it requires from six to nine days for the eggs to hatch.

One should plan to apply their first second brood codling moth spray from eight to 10 days after the first moths appear in the jar. Thorough spraying should be done at this time, as many of the second brood worms enter the sides of the fruit and it is necessary to cover the apples as completely as possible to protect them. Once having started to emerge, this brood of codling moth continues to emerge over a long period, usually six weeks to two months or longer. In seasons where worms are abundant, it will be necessary to apply a second second-brood spray which should be put on from three to four weeks after the first. In those sections of the Mississippi Valley where a partial third brood of codling moth occurs, it is well to apply a spray at the time the eggs of this brood begin to hatch, which is usually about mid-August in the southern Illinois section.

This means of determining the time of appearance of the second brood codling moth should be followed by every large orchardist each season. In Illi-

nois, observations on the developments of this insect are made each year at four points in the state and a general warning of the time of hatching of the first second brood worms is sent out to reach the grower approximately a week to 10 days in advance of the time when the young worms will start entering the apples. It is obviously impossible, however, to make these forecasts accurately for every orchard in the state, and the grower is safer if he will make his own observations and schedule his sprays accordingly.

The present season, with an abundance of rainy, cold weather, has greatly delayed the emergence of the first brood of codling moth. This is particularly true in the central sections of Illinois, Indiana and Missouri. Here, first brood adults are just beginning to come out at the time this is written, which is on June 2. This is fully two weeks later than the normal emergence. For this reason, we will expect the second brood worms to be delayed this year. The wet weather has not only delayed the emergence of the moths, but the cold periods of the past winter killed many of the hibernating larvae, so that on the whole, judging by the weather experienced thus far this season, one would not expect a heavy second brood of codling moth. There are always enough to bear watching, and many an orchardist in seasons like the present, has omitted the second brood spray to his sorrow.

The Inside Story of the Apple

Part VI.—Picking and Storage of the Fruit

by J. R. Magness

United States Department of Agriculture

THE TIME of picking the apple is of great importance in determining both its eating and its storage quality. The changes which go on during the time the fruit is growing and maturing on the tree are in part continued after picking, and are in part discontinued. The extent to which these changes have progressed before picking will consequently have a marked effect upon the quality of the fruit following picking, and will determine to a very considerable extent the way the fruit holds up in storage.

In last month's article it was pointed out that so long as the fruit and the leaves remain on the tree in a healthy condition, growth in size continues, apparently at a rate very nearly equal to that of the main growing season. This growth in size, of course, ceases with picking. Likewise, the development of red color stops when the fruit is removed from the light, and under commercial conditions may be said to stop with picking. The change in the green color from leaf green to a yellow shade, on the other hand, continues as the fruit ripens following removal from the tree. There is probably no further deposition of wax following the picking. The decrease in the acidity of the fruit continues, as does also the disappearance of the starch and an increase in the amount of sugar. The total quantity of carbohydrate materials in the apple does not increase following picking, but the proportion of these materials which are in the form of sugar does increase for a considerable period of time.

Causes of Loss of Fruit in Storage

In order to understand fully the influence of time of picking and of storage conditions upon the way the fruit holds in storage, it is necessary to know the four main ways in which the fruit breaks down in storage. These are: (1) Over maturity. The fruit softens and finally becomes dry and mealy, sometimes even breaking down and becoming mushy and discolored inside. Even if the fruit does not become discolored inside, an overripe apple is of very poor quality and of very little value. (2) Storage scald. This is the brown to black discoloration which so often appears on the skin of certain varieties, either while in storage or following their removal to higher temperatures. The exact cause of storage scald has not been definitely determined, but the conditions under which it develops, and control measures, are fairly well known. (3) Decay. Apple rots in storage are caused by fungous organisms obtaining entrance into the apple and growing within the tissues of the fruit. (4) Wilting. While this is somewhat less important than the three preceding causes of loss in storage, nevertheless it is of much importance under certain conditions. It is caused by excessive evaporation or loss of moisture from the fruit, and may be very serious with certain varieties, particularly when the apples are held in open containers or under conditions of ventilation with dry air.

The means of preventing or delaying the occurrence of these various forms of deterioration will be discussed in relation to the time of picking and methods of handling.

Over Maturity of Apples in Storage

It was pointed out last month that one of the marked changes occurring in apples as they ripen on the tree is the softening of the fruit. Even varieties that appear very hard at time of picking are going through a continuous softening process. This process, which is going on while the fruit is on the tree, continues even more rapidly following removal from the tree, provided the fruit is held at the same temperature as that prevailing in the orchard. Thus apples will soften faster in boxes or barrels under the tree than they will if attached to the tree. If they are placed at once

in lower temperatures, however, this softening process is greatly retarded. The only feasible means of retarding the softening process following picking is to hold the fruit at low temperatures.

If the fruit is not to be placed in cold storage, but rather is to be held in air cooled storage, it is of much importance to remember that the fruit softens faster while off the tree and exposed to orchard temperatures than it does while on the tree. The temperatures in air cooled apple storages will generally not be less than the mean orchard temperature, and may in many cases be higher. Consequently, it may be said that if the fruit is to be held in common air cooled storage, it is better off on the trees than in the storage house until it begins to drop badly, or until there is serious danger of freezing injury.

For fruit that is moving into cold storage, late picking will result in fruit being softer when it moves into the storage rooms, and consequently it will be somewhat softer at the end of the storage season. Unless the variety tends to scald badly in storage, it may be picked in a much more immature condition for cold storage than would be advisable for common storage. For those varieties which tend to scald badly, however, late picking is desirable, regardless of whether cold or common storage is to be used.

In this connection, the importance of moving fruit intended for cold storage into the cold rooms immediately following picking should be emphasized. One day at 70 degrees Fahrenheit such as often prevails at picking time, will soften most varieties of apples as much as 12 to 15 days at 30 to 32 degrees Fahrenheit, the temperatures which should be maintained in cold storage rooms. Thus every day the fruit is out of storage in the fall will markedly shorten the possible holding time for the variety. It is important not only that the fruit move into storage promptly following picking, but also that it be cooled quickly once it is in the storage rooms.

Finally, there is a great difference in the rate of softening of different varieties of apples. While no attempt will be made to classify all of the commercial sorts in relation to their rate of softening, the tendency of certain varieties may be indicated. Such varieties as Wealthy, Grimes, Jonathan and Rhode Island Greening soften very rapidly and will be in prime eating condition within a few days if held under warm conditions. A group of varieties which soften much less rapidly than the above will include Delicious, Rome Beauty, Baldwin and Stayman Winesap. These varieties are not very satisfactory for common storage holding except in northern districts, where they mature late and cool weather comes on quickly following their picking season.

A third group of varieties will include those which actually soften very slowly, even at temperatures of

around 50 degrees. In this group are such varieties as York Imperial, Winesap, Black Twig (Arkansas), Yellow Newtown (Albemarle Pippin) and Ben Davis. These represent varieties which can be held successfully in common storage much further south than can varieties of the second group.

Storage Scald

The development of storage scald varies greatly with the variety, with the time of picking, with the type of packing used, and with storage conditions. These factors can be discussed only briefly in this article.

Almost all varieties will develop scald under certain conditions. There is a wide range in the susceptibility of different varieties, however. Among the varieties which scald most severely would be included Black Twig and York Imperial. Varieties upon which it is often very bad include Wagener, Grimes, Rome Beauty, Rhode Island Greening, Stayman Winesap, etc. Varieties less likely to scald than these, but upon which scald may be severe, include Delicious, Winesap, Baldwin, Yellow Newtown and Ben Davis. Jonathan and Northern Spy are varieties which are almost never affected by scald.

The time of picking the fruit is of great importance in controlling apple scald. If fruit is allowed to remain on the trees sufficiently late, scald can be greatly lessened and in some cases entirely avoided. Unfortunately, labor conditions and the great amount of work at harvest time may make it impracticable to delay picking sufficiently to secure this result. Also, during certain seasons some varieties may begin to drop badly when still too immature to store without scald development. For varieties of the first two groups named, however, distinctly better storage fruit will usually be obtained if the apples are left on the trees as long as possible before picking. Even for fruit going into cold storage, the greater degree of softening before picking will not be serious, while the superior scald control will be of great advantage.

Ventilation of the storage rooms has often been recommended to secure scald control. This will partially, though not completely, control scald, provided the moving air comes directly into contact with the fruit. Ventilation of the storage room cannot be recommended as a means of control if the fruit is wrapped and is in boxes or in barrels. For those varieties which scald badly, storing in open ventilated crates will usually distinctly reduce the amount of scald.

Wrapping the fruit in oiled paper is the most generally successful method yet devised for the control of storage scald. Paper wrappers impregnated with mineral oil until they contain not less than 15 per cent of oil by weight have been found to give practically complete scald control on apples from most of the producing sections of the West. Control of scald by oiled wrappers on fruit in the

more humid apple districts has not been so uniformly successful. In most of the tests on fruit even from the humid districts, however, the use of oiled wrappers has distinctly lessened scald development.

To summarize, we may say, then, that for the control of apple scald the fruit, if practicable, should be stored in oiled paper wraps. The varieties which are highly susceptible to scald should be picked as late as possible, for some unknown change occurs late in the growing season which greatly decreases the amount of scald which will develop. Immediate storage following picking, at temperatures of 30 to 32 degrees, will result in less scald than will develop following a delay in moving the fruit into cold storage. If impracticable to wrap the fruit, the storing of highly susceptible varieties in open containers and with air movement will likewise reduce scald development.

Decay of the Fruit in Storage

In order that fruit may decay in storage it is essential that a fungous organism gain access to the flesh of the fruit. The intact apple skin is highly resistant to the penetration of fungous organisms. Consequently, it is only rarely that decay in a firm apple starts without a break in the skin. It thus follows that care in spraying, to reduce insect and disease injury in the orchard, accompanied by careful grading, to eliminate those apples which are injured, will greatly decrease decay. Also, care in handling is essential. Great damage is often done in heading barrels or putting lids on boxes packed with too great a bulge. The bruising and breaking of the skin which results affords a splendid opportunity for the entrance of rot organisms. Finally, immediate storage at low temperatures is of great value in reducing decay. Most of the organisms causing decay of apples in storage will not infect an apple at a temperature of 30 to 32 degrees Fahrenheit. Once the infection occurs and the fungus is established, it will grow slowly even at these low temperatures, but initial infection will rarely occur; hence, again, it is important that the fruit be cooled promptly if loss from decay is to be avoided.

Wilting in Storage

Wilting of apples in storage is due to loss of moisture from the fruit, and is usually associated with small wax development on the skin. It can be avoided or lessened by adding more moisture to the air, thus reducing evaporation, or by placing the fruit in fairly tight packages, which also retards evaporation.

In air-cooled storages, if the fruit shows evidence of wilt, sprinkling the walls or floors once or twice a day will increase the moisture in the air and reduce wilting. For varieties which tend to scald badly, storing in headed barrels will generally result in much less evaporation from the fruit.

In cold storage, wilting may also result if the air in the room becomes too dry. A humidity of 85 to 92 per cent saturation should be maintained to avoid moisture loss from the fruit during the long storage period. In regions where considerable refrigeration must be applied throughout the winter, wilting is particularly likely to occur in cold storage since the cooling-pipes are continuously drying the air by freezing out the moisture. Under these conditions, it may be very desirable to moisten the air by occasionally sprinkling the floor and packages.

Tests for Time of Picking

Many tests have been used to determine when apples are ready to remove from the tree. Color of seeds, ease of separation from the tree, the amount of red color on the fruit, the shade of the ground color, or of green, the apparent hardness of the flesh—

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W. C. O'KANE, Durham, N. H.
E. P. SANDSTEN, Horticulturist, Colorado Agricultural Experiment Station, Fort Collins, Colo.
F. C. SEARS, Department of Pomology, Massachusetts Agricultural College, Amherst, Mass.
W. P. TUFTS, Assistant Professor in Pomology, University of California, Davis, Calif.
O. F. E. WINBERG, President, Gulf Coast Horticultural Society, Silverhill, Ala.

Summer Pruning of Brambles

IN THE rush of summer work, many tasks call for attention. Quite commonly all of them cannot be performed. In such cases, the growers who use the best judgment in what shall be done and what shall be left undone will in the long run prove the most successful. The summer pruning of brambles is one job that will nearly always repay attention. Without a certain amount of summer pruning, the best fruiting results cannot be obtained.

The canes of brambles live only two years. In the first season, they make their principal growth, and in the second they bear their crop of fruit, after which they die. The object of summer pruning is to give the young canes a proper shape and growth for the best fruiting results. In the case of blackcap raspberries, summer pruning also increases the set of new plants from the tips.

The young canes grow very rapidly early in the season. If left unpruned, they soon develop into long canes, which sway about in windy weather. Such canes are also damaged easily by tillage tools, and they may break off when laden with fruit the following season. The breaking off may be avoided, it is true, by heading back the canes the following winter, but such large canes are usually hollow and the cut surfaces offer exceptional opportunity for damage by weather, insects and diseases.

In order to avoid these disadvantages and to gain other benefits, the young canes should be headed back when they have reached a height of 18 to 24 inches. In some places and with certain varieties, it is customary to allow the canes to reach a greater height before they are headed back. It is sufficient to merely remove the terminal bud. It is best removed either by pinching or with a sharp knife. Since the canes reach the desired height at different times, it is necessary to go over the plants several times to secure the best results.

The heading back of the young canes insures a small wound which heals readily. It causes the cane to become more stocky and to branch. Thus, a much better growth and habit for fruit bearing is acquired than if the canes receive no summer pruning. The heading back of young canes is one of the summer jobs which should receive attention.

In addition to heading back the young canes,

many growers also remove the old canes after they have produced their crop of fruit. The old canes are cut close to the ground. The removal of these old canes is a desirable practice, since the young canes are given more room in which to grow. However, it is a time-taking job, and many growers allow them to remain until the following winter.

Propagating Blackcap Raspberries

BLACKCAP raspberries, unlike red raspberries and blackberries, are propagated by tips. The canes in late summer bend over until the tips reach the ground. The terminal bud enlarges, and, on being given suitable condition, enters the ground and takes root, after which the bud bends slightly upward. Some growers and nurserymen sever the young plants from the canes in the fall, when they dig and store the plants for late winter and early spring trade. For home planting, however, it is best to remove the plants in the early spring.

Sometimes the canes root fairly well without attention, but in this case, the plants are often of undesirable shape. Furthermore, without attention, many tips simply push about among the grass and weeds or on the dry, hard ground, without being able to gain a foothold in the soil. The best results, either in the number or shape of the plants, are usually secured only when plants are given assistance.

In the first place, the ground should be kept cultivated and as free as possible from weeds and grass. It is also advisable to head back the young canes in the summer, as described in another article, in order to cause them to branch. This increases the number of tips and the number of plants produced.

When the tips begin to reach the ground, one should either cover them with loose soil or, better still, dig a shallow hole with a trowel or gardener's dibber and insert the tip and cover it with soil. The best shaped plants are secured when the tips are set in a fairly perpendicular manner. Canes which are thus handled as soon as their tips reach the ground will take root quickly, and they will produce better and stronger plants than if the canes are allowed to shift for themselves. The tips reach the ground at different times and it is therefore desirable to go over the patch about once each week during the propagating season in order to secure the largest possible set of young plants.

In the event that there are any missing places in the rows, new plants can be established in those places by rooting canes in the places desired.

If a grower is not interested in selling plants and does not wish to set a new patch, there will be no necessity of assisting the tips to gain a foothold, for new canes will arise from the old roots each year to renew the patch.

Railroad Publicity

IN RECENT hearings before the Senate Committee on Interstate and Foreign Commerce, attacks were made on the expenditures by railroads on Public Relations advertising. No claim was made that the advertising in question was untrue to fact, but it was contended that the railroads had no right to include as operating expenses money spent in acquainting the public with the facts about the railway business and the views of their officials about railway regulations. One senator proposed to introduce a bill in Congress preventing railroads from advertising to influence public opinion.

It is not our purpose to espouse the cause of railroads, any more than it is to support any other class of commercial organizations. We can see no justification, however, in the legislation suggested, and we believe that if

such legislation is passed, our law-makers will set up a precedent which in time will do more harm than the good its proposers think it will do.

Even though railroads are regulated by the government to a certain extent, they are still private commercial enterprises. They are supported by the stock and bond investments of thousands of people and it is only natural that they should desire to take care of the interests of these investors. If the railroads are prevented from presenting their case, then it follows logically that every other commercial interest should receive the same treatment.

Our democracy is founded on the principle that all things, so far as possible, should be settled on the basis of fairness and justice, and after consideration of all available evidence. In our courts, an accused person has a right to fully present his side of the case, and no objection has ever been raised to this principle, no matter how guilty or innocent the party may be.

It is difficult to see how any harm could result from the railroads presenting their case to the public, provided they confine themselves to facts. The government may properly interfere, we believe, if they make statements untrue to fact, but not otherwise. Facts can never hurt anyone, except those with selfish interests at stake. Although we should like to see railroad rates reduced, the same as most other people, when operating conditions warrant it, we have no fear of the facts in any event, and we do not believe the American people want even the case of the railroads decided without a full presentation of the facts on both sides.

Orchard Tour of Seventeen States

FOR THE first time in the history of American Horticulture, a large number of the State Horticultural Societies are co-operating in a summer tour that will cover a large portion of the United States—the Central West, East and Northeast. This spirit of teamwork between this large group of states bespeaks highly of further co-operation between all horticultural interests.

This tour has been arranged by the American Pomological Society—the 76-year-old national society of horticulturists and orchardists. One of the aims of the tour is to bring before the public, the advantages of increased consumption of American grown fruit.

The American Pomological Society is staging a national "Eat More Fruit" Campaign that will doubtless result in a great deal of benefit for all of the fruit growers, no matter what character of fruit they are producing. One of the most important problems before the fruit grower is undoubtedly that of getting increased consumption of fruit per capita by the American public.

We earnestly urge all growers who can possibly do so to attend a part of this tour and to boost the work of the "Eat More Fruit" Campaign. A short article by Paul Stark, President of the American Pomological Society, appears in this issue.

Your Experiences

FRUIT growers throughout the country are always anxious to hear about how the other fellow is doing it, and stories of your experiences in growing good fruit will be of interest to them. We, also, would like to know more about your methods and we want you to write us about them and, if possible, send along a photograph of your orchard, home, packing plant or any special feature worthy of mention. These stories will be published from time to time and will be of interest, for we all like to read about how you have made a success of fruit growing.

Grape Growing in Missouri

by T. J. Talbert
University of Missouri

Varieties.

There are only two varieties being grown commercially in the Ozark region. These are Concord and Moore Early. Perhaps 90 per cent of the acreage is Concord. The greatest planting of Moore Early is in the vicinity of Neosho.

In the East Central district, many

increase as the grape industry is developed. Since the growing season is longer in the Ozark region, the pests are usually more severe there and a greater number of sprays are required.

The fungous disease known as black rot is the most important single pest. This is especially true in the Ozark

trol both diseases and insects. It is important, therefore, that the grower know what insects and diseases are present in order that he may spray effectively against them. About four or five applications are necessary in the Missouri River and Northwestern districts, while seven or more may be required in the Southwestern district or Ozark region.

Spraying

Since spraying is the most important single problem confronting the commercial grape grower in Missouri, the complete spraying schedule of the University of Missouri College of Agriculture is given:

Dormant Spray—Apply winter strength lime-sulphur solution (one gallon of the commercial concentrate to eight gallons of water) before the buds swell in the spring, for scale and anthracnose. If only anthracnose is present, Bordeaux mixture 3-8-50 may be used in place of the lime-sulphur. If neither scale nor anthracnose is present, this spray will not be needed.

Bud Spray—This is a special spray made for flea beetle only and need not be made unless flea beetle is present. Apply as soon as the buds swell and repeat one week later, using three pounds of the powdered arsenate of lead to 50 gallons of water.

First Regular Spray—This spray is a part of the regular spraying program for grapes and, except in vineyards relatively free of black rot, should always be made. Apply when most of the shoots show the second or third leaf, using Bordeaux mixture 4-4-50 for black rot and anthracnose, and arsenate of lead (dry), three pounds to 50 gallons for flea beetle. If flea beetle is not present, the lead may be omitted.

Second Regular Spray—Apply just before the blossoms open, using 4-4-50 Bordeaux for black rot, anthracnose, downy mildew and other fungous diseases, and arsenate of lead (dry) three pounds to 50 gallons of water for curculio and other chewing insects. This is an important spray and should always be made.

Third Regular Spray—Apply just as the petals fall or as soon as the fruit has set, using 4-4-50 Bordeaux for black rot, anthracnose, downy mildew, and other fungous diseases, and arsenate of lead (dry) two pounds to 50 gallons for curculio, berry moth and other chewing insects. Also an important spray which should always be made.

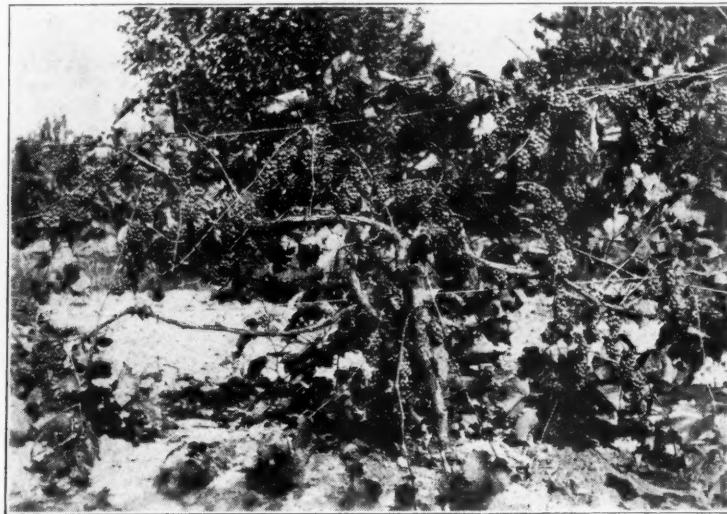
Fourth Regular Spray—Apply 10 to 14 days after the third spray, using Bordeaux 4-4-50, arsenate of lead (dry) two pounds to 50 gallons and nicotine sulphate at the rate of one-half pint to each 100 gallons of Bordeaux mixture for black rot, anthracnose, downy mildew, curculio, berry moth, leaf folder and the grape leaf hopper. This is the most important spray for the leaf hopper, and care should be taken in applying this spray to thoroughly cover the under sides of the leaves. This is also an important spray for grape curculio.

Fifth Regular Spray—Apply in about two weeks after number four, or about the first of July, using the same materials at the same dilutions as used in the fourth spray.

Sixth Regular Spray—Apply two weeks after the fifth spray, or about the middle of July, using Bordeaux 4-4-50 for black rot and arsenate of lead (dry) two pounds to 50 gallons for chewing insects. This spray is seldom necessary in north Missouri and is usually omitted; but it should be made in south Missouri.

Later Spraying—The above regular foliage sprays if properly made are usually sufficient except for varieties very susceptible to the attack of black rot and in warm damp summers favorable to black rot, when one or two additional sprayings, at intervals of 10 days to two weeks, may be necessary. To prevent spotting the fruit, some non-staining spray, such

(Concluded on page 11.)



From Mo. Agr. Exp. Bul. 208

A loaded grape vine in a well kept Missouri vineyard.

of the old vineyards are planted almost exclusively to the wine grapes. The later plantings, however, are largely Concord.

In the Northwestern district, the acreage is made up almost entirely of Concord, with Moore Early as second in importance. The later plantings here have also been largely to Concord.

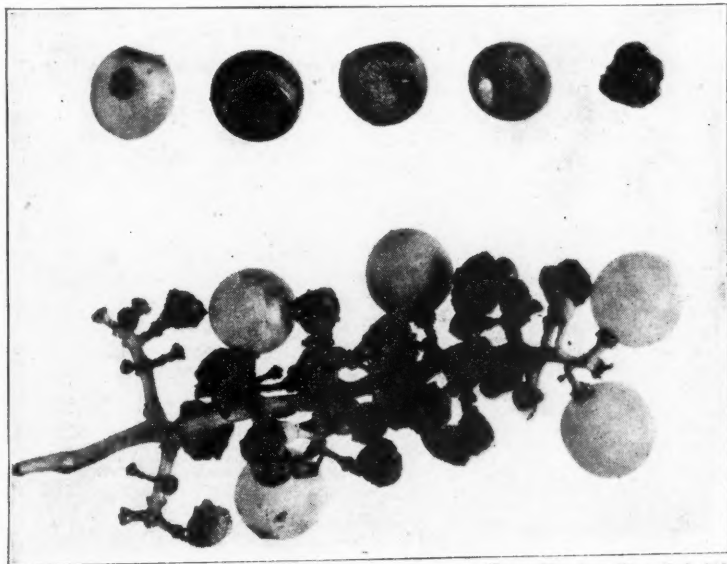
Diseases and Insects

The diseases and insects of most importance to Missouri grape growers

are black rot, berry moth, grapevine flea beetle, leaf hopper and grape curculio. In general, it may be said in the Ozark region that these pests are not doing a great deal of damage at the present time. Most of the vineyards are new and this would seem to account for this fact. We may expect, however, that injury will

This fungus attacks the fruit, leaves, tendrils, leaf stems and shoots. The disease discolors the fruit, causing it to turn brown. The berries become shrunken and dry to mummies.

The other diseases and insect pests are of minor importance as compared to the black rot. All of the injurious insect pests and vine diseases may be controlled by the regular foliage and fruit sprays. It is seldom necessary to make an extra spray for an individual insect or disease.



From Mo. Agr. Exp. Bul. 208

Black rot on the fruit. The berries at the top show the disease at different stages of development. Black rot first appears on the fruit as a small light colored spot, which soon becomes blackish in appearance. The rot develops rapidly and soon involves the entire berry, which dries into a black mummy.

are black rot, berry moth, grapevine flea beetle, leaf hopper and grape curculio. In general, it may be said in the Ozark region that these pests are not doing a great deal of damage at the present time. Most of the vineyards are new and this would seem to account for this fact. We may expect, however, that injury will

Arsenate of lead is used for controlling biting and chewing insects; nicotine sulphate for controlling sucking insects like leaf hopper and aphids, and Bordeaux mixture for controlling the fungous diseases. All of these spraying chemicals are mixed together and applied at the same time, making one application serve to con-

GRAPE growing on a commercial scale in Missouri came into prominence about 1850. In the districts about St. Louis, Herman and other Missouri river towns, the industry assumed great importance between 1860 and 1870. Following this period, there was a decline in acreage due to the ravages of black rot and other fungous diseases, for which at that time there was no successful means of control.

Within the last three or four years, grape growing has assumed an important role, especially in southwest Missouri. There are now more than 5000 acres planted to grapes in this region, but only a small part of this acreage has reached bearing age. Shippers estimate that this year's crop will more than double that of any previous season and that by 1925 shipments will range between 1000 and 1500 cars of grapes.

Grape growing on a commercial scale in Missouri is confined mainly to the following regions: The Ozark section, including about a dozen counties in the southwestern part of the state; the Missouri River section, including seven or eight counties; and the Northwestern section, including some five or six counties. Of these three regions, the Ozark grape belt of southwest Missouri is now the most important. Until recently the East Central River section was much more important.

Grapes are now being planted extensively at practically all the places in the Ozark district where strawberries have formerly been grown on a commercial scale. Grape and strawberry production is going forward together in this district as the acreage on the whole of both has been on the increase for the past two or three years and many growers are making these crops their major project.

Grape growing has also assumed commercial importance at two points in northwestern Arkansas, Tontitown and Altus. The soil and climatic conditions of northwestern Arkansas and southwestern Missouri are similar. The grape growing section of the two states may logically be considered together. The growers of both states are co-operating to their mutual advantage in production and marketing methods. The leaders of the industry are endeavoring to foster and encourage this friendly co-operation and helpful assistance. A grape juice plant is now in operation at Springdale, Ark. This is just 30 miles south of Seligman, Mo., which is located near the State Line.

The second most important grape growing region of Missouri consists mainly of St. Louis, St. Charles and Gasconade counties. These counties have maintained their present acreage of from eight to ten thousand acres for years, in fact, as early as 1899, the value of grapes, wine, etc., was \$43,480 in St. Louis county, while Gasconade county followed with a crop valued at \$9936, and St. Charles county \$8010. Plantings have increased here with the advent of prohibition. In earlier times the grape wine industry was an important one in this region. Splendid vineyards and spacious wine cellars were very common 10 or 12 years ago. Within the last two or three years, there has been an increased planting of grapes and a demand for a revival of the industry, although the planting has not kept pace with that in the Ozark region.

In northwest Missouri, the grape industry has been established for a longer period than in the Ozarks, but it developed much later than in the East Central region. This region now has an acreage of about five to seven hundred acres. There has been a steady growth in the planting of grapes within recent years. The soil and climate of this district are well adapted to the industry and with prices continuing good, there should be a substantial increase in acreage in this region.

Orchard Sanitation and Hygiene

by George L. Peltier
University of Nebraska

THE REASON why you have diseases in your orchards from year to year is solely due to the fact that you have not eliminated the source. Through spraying you can control certain diseases during the growing season and prevent them from developing into epidemics, but you must combat these pests year in and year out. Why not take the most difficult course, but the easiest in the long run, and eliminate all serious diseases from your orchards which cannot be controlled by spraying. In practice, this is the most difficult procedure, in that we must have the concerted action on the part of many individuals to carry out such an ambitious program. One individual may eliminate a disease from his orchard, but if his neighbor does not do likewise, it will be of little value, as the winds, insects and other natural agents of dissemination, will carry the germs of disease back into his orchard. Again, if a number of growers clean up their orchards and fail to take notice of the diseased trees growing in the vicinity, they will still have a source of disease which will menace their orchards.

Destroy Neglected Orchards

Orchard diseases are propagated by spores or germs which either passed the winter in the trees themselves or in the neighborhood. Every grower should take it upon himself to cull out his diseased trees, prune out diseased twigs and eliminate all refuse which might harbor the disease spores. Of course, this is a rather tedious job but one that will pay in the long run. By all means, the abandoned and neglected orchards should be destroyed as each orchard of this type serves as a breeding ground and center for the spread of insect and fungous pests commonly occurring in orchards.

The grower has two thoughts in mind in managing an orchard; namely, high yields and quality, as a combination of the two brings him the best

returns from the market. Then why not take as great precautionary measures as the man who, let us say, raises fancy animals? If a stock man has an attack of a contagious or infectious disease among his cattle, he is sure to isolate or kill the diseased animals as soon as the disease is noticed. How much more quickly does he act than the orchardist, who will neglect to cut out diseased trees in his grove.

I do not think that the grower has ever appreciated the value and the length of life of his trees as compared, say, with a good producing cow. After the difference in labor costs is subtracted, I think he will find when the length of life of his tree is considered that a high producing tree will yield as good a return as a good producing cow.

Thus, I would urge all fruit growers to keep their orchards as free from diseases as is humanly possible, through the elimination and prevention of the source and centers of disease which are a menace to successful orchard production.

General Health and Thriftiness of the Trees

It is not sufficient that you maintain efficient sanitation in your orchards, but you must also look to the general health and thriftiness of the trees themselves—in fact, you must go still further and not only grow healthy trees but trees that produce and yield returns. You must also bear in mind that the native fruit trees growing where competition is keen can maintain themselves in health to a much better advantage than the highly specialized, grafted or budded varieties which you raise in your orchards. Through breeding, selecting and culling, new varieties embodying more desirable features of high yield and quality are being originated, until per-

haps we may reach a point where we will destroy the internal equilibrium of the trees and make them more susceptible to disease.

Plants are much more susceptible to disease than animals. This should be expected owing to their decided difference in make-up. The chief differences, of course, occur in the absence of blood circulation and its efficient properties in combatting diseases, once infection takes place in animals. Thus, plants are not only more susceptible to disease than animals, but their recovery is less certain if the disease is allowed to go unchecked.

Growth of fruit trees, like other plants, may be considered as the function of two variables. The first of these is the genetic constitution of the individual. The second is the resultant of those factors that make up what is commonly called environment. The first variable, namely, the genetic constitution of the individual, can be controlled more or less by the plant breeder through selection, breeding and culling out of undesirable varieties and the production of new varieties embodying all the desirable features that go to make up a good individual.

On the other hand the growers can do little to control the external factors, commonly called environment. Environment includes factors, such as temperature, moisture, light, nutrition, etc. I think that you will all admit that the biggest gamble in fruit growing is the uncertainty of the weather in season and out of season. Favorable weather during rather short intervals during the year determines to a large extent whether you will have a good crop. Again other weather conditions determine whether disease will be prevalent in your orchards.

How is the grower going to meet these conditions over which he has

no control? The answer is simple, but the procedure can be carried out only with some thought and work on the part of the grower, even before he sets out his trees.

Conditions Necessary to Successful Orchard

The first prerequisite to successful orcharding is the location and type of land chosen for the orchard site. Second, a study of the local weather conditions is necessary. Third, varieties must be chosen which will maintain themselves in health and vigor under these conditions. After these conditions have been fulfilled, through common sense orchard management, the trees must be kept in full health and vigor so that they will produce bountiful crops. Thus, while the grower has no control over external factors, he can, by the choice of location, study of local weather conditions, selection of desirable varieties and common sense management, so adjust his trees to those uncontrollable factors that he can maintain them in health and vigor and so obtain maximum production under these conditions.

I wonder what you would say of a dairy man who sent out letters to various firms asking bids on 50 cows and bought them at the lowest price offered. I know you would be inclined to use some pretty strong adjectives in telling what you thought of him. And still, isn't this what a lot of growers do? Perhaps they do not go as far as to take the lowest offer, but what do they know about the trees they are getting? When a dairyman buys a cow, he wants to know all about her father and mother, yes, even her grandfather and grandmother, and then some, in fact, he is not satisfied as to her ancestors, but the cow must be sound herself and be tested for tuberculosis, etc., before she is accepted. Why shouldn't an orchard grower make the same demands on the nurserymen, both for pedigree and disease-free stock? He

Biggest Horticultural Tour Ever Planned

by Paul C. Stark

President The American Pomological Society

FOR YEARS the horticultural societies of the different states, in arranging the dates for their summer meetings, have consulted their own convenience and have not given a thought to the fact that there are many horticulturists and orchardists in other states who would probably attend, if meeting dates did not conflict.

This summer the American Pomological Society has arranged for co-operation of 17 states that have arranged their meetings two or three days apart so there will be no conflicting dates, and so one state meeting follows another. The American Pomological Society will co-operate in the program in each state and an official American Pomological Society speakers' car will go from state to state, thus giving the orchardists of each state an opportunity to hear some of the leading horticultural authorities of the United States. The speakers will go in relays, each speaker being on the programs in several states.

In the following list where the name of the state is given, it indicates that the State Horticultural Society meet-

"touring" is opposite dates, it indicates time going from one state to another. Although no special itinerary on these "touring" dates can be lined up now, opportunity will be given to visit any interesting orchards that happen to be on the line of travel from state to state.

The line of tour has been arranged so that there will be the shortest jumps possible from state to state. Furthermore, the general direction of the route has been arranged so that most of the tour will be on hard surface roads, where road conditions will cause the least possible amount of trouble. All details of program, etc., to be under supervision of the State Horticultural Society.

All orchardists should endeavor to attend their own state tour and meeting—also the tour in as many of the other states as possible. This is a united effort to better the orchardist's condition and everyone should get behind the movement and boost to make it a splendid success.

Working together in this way, the American Pomological Society and the combined societies of these 17 states should make the summer of 1924 the greatest summer in the history of scientific orcharding in this country. Programs have been arranged for each meeting, that will include speakers, nationally known, and in each state a tour will be arranged where outstanding orchards will be visited and conditions observed that should result in much good. Some of the states say

that they expect to have 1000 people present at their meetings. All states are working to make their summer meeting the greatest meeting of its kind they have ever held, and horticulturists all over the eastern half of the United States are looking forward to this American Pomological Tour and to the horticultural meetings to be held at that time.

This tour of the American Pomological Society, it is hoped, will mark a new era in summer horticultural meetings, will add greater interest, will insure larger crowds and will result in increased memberships to these societies and add largely to their prestige.

The American Pomological Society invites all growers who want to join the tour with their automobiles before it reaches their state and stay with it after it reaches their state to do so. This will enable any orchardist to stay on the tour as long as he desires. Orchardists are encouraged to make this a short vacation trip, taking their families with them. Fruit growers everywhere should get in touch with the secretary of their State Horticultural Society for full particulars in regard to the tour, or write direct to the president or secretary of the American Pomological Society.

Eat More Fruit Campaign

On this extensive tour, the American Pomological Society will begin its active work on the "Eat More Fruit" Campaign that has been carefully

planned and worked out by its officers and committees. The Campaign has already been started for this year and it is planned to greatly increase its activities and scope next year.

The object of the "Eat More Fruit" Campaign will be clearly brought before the societies and before the public during this trip. The value of fruit from a standpoint of health, food and economy will be discussed and the ground work laid for the Campaign they expect to make. It is expected that the fruit growers of the nation and those business institutions whose market is chiefly or partly with farmers who grow fruit, will help in a substantial way this, the first organized effort to increase the consumption of fruit.

A little team work and united effort on the part of all who are interested in having the fruit growing industry on a permanently prosperous foundation, will accomplish remarkable results in a short time.

Food experts, dietitians, doctors, dentists, and other authorities have forcibly presented the food value facts about fruit and the need of increased fruit consumption for the best interests of the human body. Home economic experts have demonstrated the unlimited number of uses and means of preparation of fruit for the table, together with the statements of their high energy and fuel value for the human system. With this great array of facts and the actual backing of their statements by the United States Department of Agriculture, State Agricultural Colleges, Experimental Stations, Home Economic Departments, State Horticultural Societies, and many others interested, the battle is already half won.

July—	7-8 New Jersey
14-15 Kentucky	9 New York
15-16 Indiana	(Hudson Val.)
17-18 Illinois	10 Touring
19-20 Touring	11-12 Connecticut
21-22 Michigan	13 Rhode Island
23-24 Touring	14 Massachusetts
25-26 Ohio	(Eastern)
27-28 Touring	15-16 Maine
29-30 Maryland	17 Touring
31-1 West Virginia	18-19 N. Hampshire
August—	20 Touring
2 Virginia	21 Vermont
3 Touring	22-23 Massachusetts
4-5 Pennsylvania	(Western)
6 Touring	24 Touring

ing (of that particular state) will be held on these dates. Where the word

can, but not until he is willing to pay a premium for such stock, the same as the dairyman does.

I really believe that the relative low cost of nursery stock has retarded the fruit industry in this country more than it has stimulated. Low priced trees mean a larger acreage at the beginning, which is usually followed in a few years by a high percentage of neglected orchards, and eventually a small acreage of bearing trees. It costs just as much to bring a poor tree to bearing as a high grade one. Then why not add to the original cost and get good high producing varieties, free from disease, to start with?

Why not go to the nursery yourself and select strong, vigorous stock of varieties well adapted to your local conditions and resistant to the more prevalent diseases in your locality, budded or grafted with buds or scions taken from high producing trees? You should be willing to pay a premium for high-grade nursery stock. So long as the growers demand cheap trees, the nurserymen will furnish these to them, but once the nurserymen are convinced that the growers demand high quality trees, then they will change their methods.

Once a beginning is made through the use of good high-grade trees, these trees must be kept in good health, for a healthy vigorous tree is more resistant to disease.

Spraying Not a Cure-all

I do want to instill into your minds that spraying alone will not prevent all the diseases in your orchards. As the medical men are getting away from the idea of giving ill-smelling medicines for every ache and pain, so the growers must realize that spraying is not a cure-all. Many growers have a mistaken notion that if they can produce clean, marketable fruit through spraying, that their trees necessarily must be healthy and live and bear fruit indefinitely.

Please do not misunderstand me. Spraying is absolutely essential to successful orchard management under present conditions, and should be included in the sanitation and hygiene program. Please keep in mind at all times the doctrine of sanitation and hygiene and, in combination with an efficient spraying schedule, put it into practice in your orchards. Be ever on the watch for the sources and center of diseases and eliminate them immediately. The elimination and prevention of disease cannot be accomplished over night, but will take years. Thus, it is important that you choose those varieties best adapted to your locality, and keep these trees in health and vigor, for a vigorous tree is much more resistant to plant diseases. Always keep in mind that your trees are just as valuable as good animals, and that they are vital, living things and should be taken care of accordingly.

Raspberry Troubles

(Continued from page 4.)

spray which would kill the plant lice, responsible for the dissemination of these diseases, would be of some value, but this has never been proven.

Control measures should consist, then, in first securing plants for a new plantation from sources which are unquestionably free from any of these diseases. In some states efforts are being made to aid the growers by the state experiment station establishing inspected, disease-free plantations, where "certified" plants may be secured. It will probably be a number of years before this movement will result in a sufficient supply of plants and in the meantime the growers must do all they can to protect themselves. Before planting a new field, the grower should carefully examine his old plantation or the plantation from which he is to obtain his plants. If there are any symptoms of these diseases in any part of the field, he should be careful to select his plants from some distance from such areas.

Where a large acreage is grown and where the disease has become established, it is advisable for the grower

to establish a small plantation of carefully selected plants from which he can obtain disease-free plants in the future. The farther away this "mother" patch is from the main patch the better.

In a plantation where any of these diseases have become established, the only method to hold the maladies in check is a consistent program of roguing, that is, digging out and destroying all diseased plants. Roguing, to be effective, must be followed consistently. The plantation should be gone over several times during the course of the year and the roguing process should start as early in the season as any symptoms are evident. The plants should be dug up in such a way as to secure all the roots so

(Concluded on page 11.)

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Air-Cooled Storages for Apples

(Continued from page 3.)

rents and thus provide less efficient insulation. Air spaces should, then, run horizontally rather than vertically wherever practicable.

The floors should be of dirt so as to provide sufficient humidity in the storage. In storages with concrete floors, the humidity is considerably lower and moisture must be supplied by running water onto the floor to prevent the fruit from shriveling. A concrete runway, however, through the middle of the storage facilitates handling the fruit.

Large Ventilation Capacity Essential

Cold air intakes should be located just above the surface of the ground and should not necessarily be on a level in case the ground slopes, as shown in figure two. They should be about 18 inches high and 30 inches long, inside measurements. Each air intake of this size is sufficient for about 2500 cubic feet of storage space. Thus, for a storage having 20,000 cubic feet of space, there should be eight intakes, or for one having 25,000 cubic feet of space, 10 intakes. These intakes should be provided with well insulated doors, the doors being constructed with a bevel so as to fit tightly. They may be made boxlike and filled with hair felt or they may consist of four layers of boards with water-proof paper between the boards.

Ventilating flues or warm air outlets should extend from the ceiling

of the room through the roof. They should be straight and perfectly smooth on the inside so as to offer little resistance to air movement. They should also be insulated sufficiently to prevent the warmer air in the room above the storage from interfering with the air movement inside the flue. Two thicknesses of matched lumber with building paper between them will be sufficient insulation. These flues should never be less than two feet by two feet; three by three, three by four, or even four by four feet were found to be better sizes in investigations conducted last fall. There should be one square foot of outlet flue to each 1000 to 1200 cubic feet of storage space. These flues should be equipped with tightly fitting doors which may be easily opened and closed.

Power driven fans of the propeller type increase the movement of air through the storage room but they are rather expensive to install and operate. It is cheaper to build a greater number or even larger air intakes and outlets to provide for the movement of a large volume of air at a slow rate, rather than to provide smaller openings and rely upon fans to force or increase the rate of the air movement through them.

False floors are used in some air-cooled storages and theoretically should facilitate air circulation, but whether their value is sufficient to offset the added expense in construction and the amount of storage space which they occupy, is still an open question. Investigations in Michigan during the past two seasons have

failed to show any measurable benefits due to the employment of false floors. If false floors are desired, joists should be laid about 30 to 36 inches above the earth floor, as indicated in figure one, and four-inch boards, spaced one inch apart, should be laid on the joists. If false floors are not used, boards should be laid across timbers or old posts, which in turn rest upon the dirt floor, so that the fruit does not come in contact with the earth and in order that air may circulate underneath the fruit containers.

Store in Field Crates or Barrels

Storage in either crates or barrels usually produces better results than storage in bins as the air moves very slowly through a bin of apples. Some of the Michigan growers who originally planned to store in bulk are planning to use crates after having given both methods a trial. If one insists on using bins, they should be so constructed that the air may circulate on all sides and above and below the bins. They should not be more than four or five feet in either width or depth. The bin walls should be made of three or four-inch boards and an inch space should be left between boards. Furthermore, there should be a double wall of such construction between bins.

The packages of fruit should be stacked in an orderly manner and in such a way that the air may circulate with as little obstruction as possible. Crates should be placed in rows running across the storage and there should be about two inches of space

between rows. No fruit should be stacked closer than eight or 10 inches from the outside wall.

Windows are not advisable, because of the difficulty in making them tight enough to prevent entrance of frost, but nevertheless, one or two must be provided where electric lights are not available. Entrance doors should be insulated, as suggested for the cold air intake doors.

Rate of Cooling Is Dependent Upon Management

Whenever the outdoor temperature is lower than that inside the storage, the intakes and outlets should be opened and left open until the temperature in the storage is the same as the outdoor temperature, at which time all outside openings should be promptly closed. Thus, during the fall months, the intakes and outlets are usually opened at night and closed during the day. Opening a few ventilators for a few hours occasionally during the winter will give a beneficial change of air.

In Michigan, the temperature of the fruit is usually reduced to 32 degrees under proper management by the first week in December. The temperature of the storage should be slightly lower than the mean daily temperature, provided the fruit grower is particular to open and close ventilators as soon as temperature changes warrant such operations.

Initial and Operating Costs Are Low

The cost of construction of air-cooled storages in Michigan during the past two years has varied from 25 cents to 40 cents per bushel storage capacity, depending upon the materials used in construction and insulation, and whether a second floor has been constructed for the storage of empty containers and other equipment. A very good storage of 10,000-bushel capacity can be built for about \$3500. Underground and partly underground storages have not been favored in Michigan because the cost is greater and there are no outstanding advantages claimed for them that the entirely above ground storages cannot meet. The cost of operating storages is quite low. Ten cents per bushel per season is the usual charge for storage space in air-cooled storages in Michigan and the storage owners say this represents a good income on the investment and labor involved.

The air cooled storage will not take the place of cold storage—we must have both. The air-cooled storage is recommended as a satisfactory farm storage, especially for the fruit grower who markets his fruit locally or even ships out a few carloads, and for the dealer or local co-operative fruit exchange as a place in which to hold orchard run fruit until winter or spring, when it may be sorted and moved out gradually.

J. E. FITZSIMMONS, a grape grower at Victor, Calif., has accidentally solved a very troublesome question that affects every grape grower in the country. He has found a simple remedy to use to prevent the sulphur particles and fumes from making the eyes sore. He bathes the eyes in water in which sugar has been dissolved. There is no inflammation or soreness if the sweetened water is used to flush the eyes.

Every grape grower uses sulphur from one to several times each year and always has had trouble in preventing the sulphur from hurting the eyes. Goggles and other means have been tried in vain to prevent an irritation by fumes and particles of sulphur.

Your magazine is so far ahead of nearly every other horticultural periodical that it is hardly necessary to tell you what must be an old story, that it has preferred position with us and with our superintendent month after month. There is no other paper that we subscribe to (in the fruit line) that even approaches its class.—**E. L. Hinton**, Rossmont Farms, Virginia.

Inside Story of the Apple

(Continued from page 5.)

all have been used and are used to determine when the fruit is ready to remove from the tree. And all are important from the viewpoint of commercial orcharding. Red color is essential to grade and appearance in most varieties, and hence is a very important consideration, even though it is not an accurate index to the real condition of maturity of the fruit. Ease of separation from the tree varies widely with varieties and seasons, yet must be considered in determining the time to pick, since the fruit must not be allowed to drop. The hardness of the flesh, if it can be accurately determined, will undoubtedly be an excellent index to the exact maturity of the fruit. It is the ground color of the fruit, however, the exact color of the fruit where not exposed to direct sunlight, which probably offers the best index available at the present time to the maturity of the fruit and the proper time for picking. In practically all varieties the green color should be allowed to become distinctly yellow-tinged before the fruit is sufficiently mature to soften in storage with full quality and without excessive scald development.

The important point, however, which the writer wishes to emphasize in connection with the time of picking, is that the fruit should be picked with an intelligent consideration of the characteristics of the variety and of the methods of handling in storage which are to be followed. Fruit intended for common storage holding should remain on the tree as long as possible, in order that the weather may be cool when it finally comes into storage. Apples which scald badly should be picked as late as practicable for the variety, regardless of whether they are going into cold or common storage. Varieties not tending to scald badly, and intended for cold storage holding, may be picked fairly early. Finally, the varieties which soften rapidly should be handled very quickly from the orchard to the cold storage if a maximum of holding period is desired.

From the time of the inception of the fruit bud until the apple is ultimately consumed is a long period, reaching, in some cases, to two years. Many are the conflicting factors which enter into every phase of the life history of the fruit. Many of these factors are alike unknown to the practical orchardist and to the scientist. The research work of the scientist and the practical experience of the careful orchardist are working hand in hand, however, to make the story more complete with each passing year. It has been a pleasure to the writer to record in these articles his interpretation of certain of the results obtained by the workers in the field of fruit research.

Grape Growing in Missouri

(Continued from page 7.)

as ammoniacal copper carbonate should be used. No arsenate of lead should be added to these later sprays unless chewing insects are present in destructive numbers. When used, add the powdered arsenate of lead at the rate of about one and one-half pounds to each 50 gallons of spray mixture.

Cultivation

The grape requires large quantities of moisture during the growing season to supply the needs of the foliage, wood and fruit. The soil should be stirred early in the spring by shallow disking or plowing. Deep cultivation should be avoided because the shallow feeding roots may be seriously injured. Frequent cultivation is desirable and is strongly emphasized. It should generally be continued until about August first, after which a cover crop should be sown. The cover crop which furnishes the largest quantity of green manure is usually the best. This is plowed or disked under in the spring and cultivation is again resumed.

Markets and Marketing

State reports list the shipment of 95 cars of grapes from the Ozark district in Missouri last year. Shipments from other points in the state, mainly from the east Missouri River and Northwestern districts, amount to 33 cars for the year 1922. Figures for the 1923 crop are not available. The prevailing price per ton or general average price for the season was about \$70, while the yield per acre was about three tons.

The most popular container used in Missouri is the four-quart basket, weighing from four and one-half to five pounds. In the East, however, the market is demanding a larger container and baskets holding from 16 to 20 pounds are generally used, although the four and one-half pound basket is still a favorite container.

The grape growing districts of Missouri, and especially the Ozark region, have a distinct advantage over other grape growing districts in that the Missouri harvest starts in the Ozarks from August 15 to 20 and continues into September, while practically all Concord grapes being produced in other states, except Arkansas, come on the market during September and early October. The grapes grown in the East Central and Northwestern sections of Missouri are harvested about a week or 10 days later than the crop in the Ozarks.

Co-operative Marketing

In the Ozark region, most of the crop is sold through the Ozark Fruit Growers' Ass'n. This organization has had its trials and tribulations in handling the strawberry crop, but it has stood the test and it is making substantial progress toward the handling of the grape crop.

The grapes produced in the other regions are sold on the local markets and at large consuming centers like St. Louis, Kansas City and St. Joseph. Co-operative marketing organizations have not as yet developed to any appreciable extent in these districts. Their need is felt, however, and the idea is growing.

Raspberry Troubles

(Continued from page 9.)

that no suckers will arise from parts left in the soil. The dug plants should be taken from the patch at once and burned since plant lice may be present and when disturbed they may fly or crawl to other plants. These plant lice are the only known agents of dissemination from diseased to healthy plants. Diseases of this type on other kinds of plants are known to be chiefly disseminated by plant lice and by these only in some cases. Although we do not have complete information concerning all agents which might disseminate mosaic, leaf curl and blue stem, yet we are reasonably certain that aphids are probably the chief culprits. Every effort, therefore, should be made to keep the aphids from passing from diseased to healthy plants and also to reduce their numbers in the plantation.

I wish to commend you on selecting a board of contributing editors, which I believe will prove of much benefit. I have been a subscriber to the AMERICAN FRUIT GROWER MAGAZINE for a number of years and am pleased to state that I have noted a steady improvement. Scarce an issue but contains some item easily worth a year's subscription. I bought an orchard some years ago and having no previous experience or knowledge about orcharding, I haunted the public library, reading practically everything there pertaining to it, accumulated several hundred bulletins and subscribed to some half-dozen farm papers, and I can safely state that I received more real benefit from the AMERICAN FRUIT GROWER MAGAZINE than from all other sources.—J. B. Simon, Iowa.

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Insect Enemies and Fungous Diseases of the Grape

by C. F. Greeves Carpenter

THERE are a large number of insect enemies and fungous diseases that attack the grape, and to list them all together, with the control measures, would not only occupy a great deal of space but would be unnecessary, as many of the insects occur only in comparatively restricted areas. Only the more important and, therefore, the more general insect enemies and fungous diseases are treated in this article, together with control measures.

Grapes, like any other crop, well repay care and attention. The ground should be well cultivated and kept free from weeds, grasses, rotting wood and other harbors for insects. Fertilizing should not be neglected where necessary. These ordinary precautions should be strictly observed as they tend to make the vines healthy and strong and better able to resist the onslaught of both disease and insect enemies.

INSECT ENEMIES

The Grape Leaf-hopper

This insect is very common throughout the United States and is very destructive. It pierces the leaves and sucks the sap from the undersides of the leaves. The leaves turn yellow or brown and drop prematurely. This, of course, lowers the vitality of the vines, diminishing the absorption of nutriment, and causes small fruit and loss of quality. This means a serious loss to the grower, and active measures should be taken to control the leaf-hoppers.

The adults spend the winter under rubbish, in grass, or in the warm southern states in low-growing succulent crops, such as alfalfa, gooseberries, strawberries, etc. In the colder regions, they leave hibernation in the spring and feed on such crops as mentioned above. Egg-laying commences in May. The eggs are placed just under the epidermis of the undersides of the leaves, and in from two weeks to a month these hatch into young hoppers which are white or pale yellow in color and are marked with light red spots. The young closely resemble the adults except that they are smaller in size and have no wings. These young nymphs commence feeding on the undersides of the older leaves and later they spread all over the vines. They are extremely agile and run quite fleetly when disturbed. After several molts they finally reach maturity and have well-developed wings and wing covers. In spring, the adults vary in color but generally are pale yellow with faint red spots on the wing-covers, but by winter the red spots have so increased in size as to make the insects appear dark red. The adults measure approximately one-eighth of an inch in length. In the warm southern regions there are two broods, with a possible third one, but in northern territory there is only one full brood and a partial second. Towards the end of summer the leaf-hoppers are usually in abundance in the vineyards.

Control: A thorough spraying with a coarse nozzle under heavy pressure should be given the vines when the hoppers are in the nymphal stage in May. This can be verified by observing several specimens; the elytra or wing-covers then extend only about half-way down the bodies, whereas when fully mature these wing-covers completely cover the abdomen. Spraying with nicotine sulphate (40 per cent nicotine) at the rate of one pint to every 200 gallons of water, plus four pounds of soap, or where it is desired to spray against some of the insects mentioned below, the nicotine sulphate may be added to Bordeaux mixture or arsenate of lead in the same proportions. It is useless to spray with a fine nozzle, as it would not wet the nymphs thoroughly.

Grape Curculio

Although this insect is not yet a nation-wide pest, it occurs in sufficient quantities as far west as Arkansas and all over the eastern and middle-western states to warrant a description.

It belongs to the family of curculios, and the winter is passed in hibernation under rubbish, the adults emerging during the spring. The adult is black and decorated with grayish spots, and measures only about one-tenth of an inch in length. Some few days after emergence, the adult will feed on the leaves, biting out short curved lines which are a tell-tale evidence of its activities. Eggs are laid singly in holes cut in the side of the fruit. On hatching, the young burrow into the fruit, feeding on the luscious contents with as much gusto as any invalid. On becoming mature, they leave the fruit, enter the ground and there prepare small earthen cells in which to transform to pupae and later to adults. The new adults feed on the foliage until cold weather arrives, when they hibernate for the winter.

Control: Spraying immediately after the blossoms fall with one and one-half pounds of the dry or three pounds of paste arsenate of lead to 50 gallons of water, or to the same quantity of Bordeaux mixture, will be found effective. This application should be followed by a second a month later.

Grape-Berry Moth

The adult moths appear in spring and the early females deposit their eggs on the clusters of blossoms, and those females which emerge later lay their eggs on the young grapes. The larvae hatching from the first eggs feed on the blossoms, binding them together with a light web or else entirely devouring them. Approximately three weeks is required for the young to become mature, when they transform to pupae on the leaves. This is done by cutting out an oval piece of the leaf, folding it back over the uncut part to form a roof and finally spinning a cocoon. There are two broods a year, and the winter is spent in the larval or caterpillar stage in the old leaves. These old leaves drop earlier than the others, and it is therefore a good plan to collect the fallen leaves and burn them.

Control: Spraying with arsenate of lead, one and one-half pounds dry or three pounds of the paste form and two pounds of stone lime, to 50 gallons of water. If it is desired to control fungous diseases, the arsenate of lead should be added to Bordeaux in the same proportions but without the addition of the stone lime. One application should be made within four days after the falling of the majority of the petals, and a later one should be made when the young grapes begin to touch one another, which is usually about a month after the petals have fallen.

Grape Flea-Beetles

These are small blue to green insects which measure approximately one-fifth of an inch and are capable of jumping rapidly on being disturbed—hence the popular name of "flea-beetle." They make their first appearance with the bursting of the grape buds and commence eating the buds at once. This, of course, retards leafing and results in a marked decrease in the crop.

The adults lay their eggs in sheltered cracks in the vines and in a few days these hatch into small larvae, which can readily be destroyed by spraying or dusting as they feed upon the upper surfaces of the leaves.

Control: When buds are beginning to swell, it is advisable to be on the lookout for these insects, but there is little likelihood of their appearance if the vines have been sprayed with arsenate of lead and Bordeaux mixture for

(Concluded on page 18.)

Farm Light and Power

by Lawrence J. Pearson

IT IS a recognized fact that the luxuries of one generation become the necessities of the next. For example, the telephone—a decade ago enjoyed only by a few—is now a necessity in practically every farm home in the country. The automobile is rapidly passing out of the luxury class. The same is true of the use of electric light and power on the farm. A few of the rural population are within reach of central station current. They are in the minority, however, and the vast majority must depend upon the isolated electric plant for the conveniences now enjoyed by those living in thickly populated centers.

A farm light and power installation may be considered as being made up of three main parts: The power producing, consisting of two units—the engine and the generator; the power storing, consisting of the storage battery; and the power consuming, consisting of the lights and power appliances, such as motors, etc.

It will be seen that the storage battery occupies a position of the utmost importance, in fact, it is the heart of the system. The battery absorbs the current produced by the generator and delivers it for useful work as required. With these facts in mind, the importance of proper battery care is evident.

The first rule of battery care is: Give the battery plenty of food but do not over-feed it. The food of the storage battery is current from the generator. The operation of the electrical system and the function of the battery in this system may be compared to a water system. The generator corresponds to the pump; the battery to the storage tank and the load—lights or power—to the water drawn off through the faucet. When the water tank is full, the pressure at the faucet is good. When it is nearly empty, the pressure is poor and the pump is started so as to refill the tank. When the storage battery is exhausted (discharged) by the use of the lights, or other current consuming appliances, it must be recharged, that is, it must have current put into it from the generator. When the water tank is full, any more pumping is so much waste—the water overflows. This is not only waste, but if the tank is located in the house, it may do damage. The same is true of a storage battery. Current put into the battery after it is fully charged is wasted and the life of the battery is shortened. The frequency of charging will be determined by the size of the battery and the amount of power consumed. Experience will be found to be the best guide in determining this frequency. Once it has been determined charge the battery regularly and do not neglect it.

Give Battery Pure Water.

The second rule of battery care is: Give the battery pure drinking water. An every-day comparison can be made with the human body. The body will die of thirst if it is not provided with drink. Lack of water will ruin a battery. The use of impure water in a battery is the same as the use of bootleg whiskey in place of water. If it does not kill at once, it will greatly shorten life. In the normal action of a battery, water is lost by evaporation and by charging. This causes the level of the solution in the battery cells to drop. The solution consists of a mixture of sulphuric acid and water, but only the water evaporates. For this reason only water should be used to maintain the level of the solution at least one-half inch above the top of the plates. Distilled water is best, but if it cannot be obtained, use rain water collected from a slate or shingle roof in a glass or earthenware vessel.

The following general rules should also be observed:

Keep the temperature of the Battery Room as nearly uniform as possible; neither too hot nor too cold. The temperature of the battery cells should never exceed 110 degrees Fahrenheit. The battery should not be exposed to

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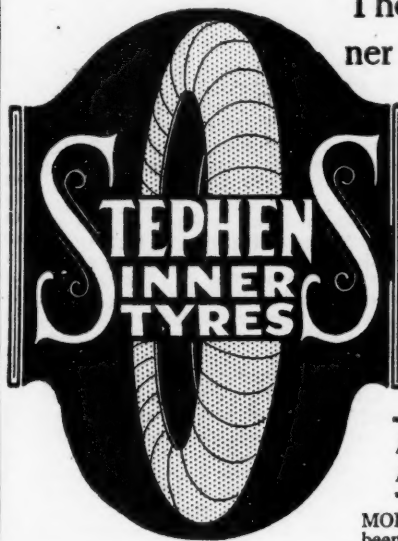
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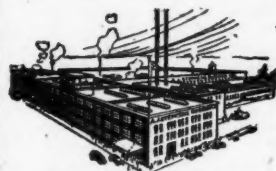
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low temperatures as it is likely to freeze when it is discharged. Keep the tops of the cells clean and free from accumulated dust and dirt. Make sure that all connections between cells are clean and bright when first made and are prevented from corrosion and oxidation by being coated with vaseline.

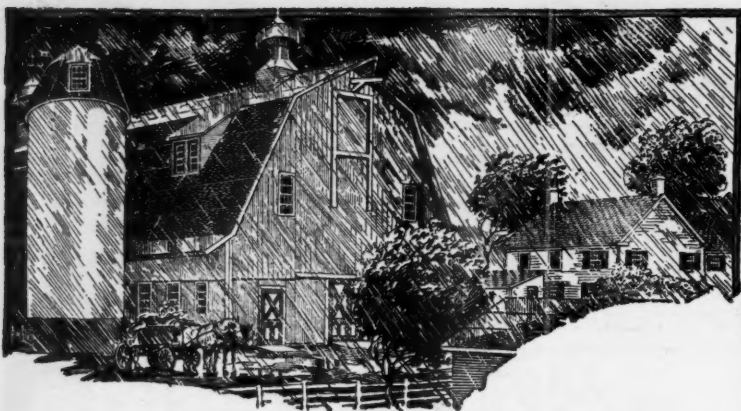
Another point to be considered is the size of the battery used. When installing a plant, or before renewing the battery on an existing plant, careful consideration should be given to

the size of the battery. In many cases the life of the battery has been greatly shortened by overloading it. It is the tendency to add various electrical appliances after the plant is first installed and if provision has not been made for them the battery will soon be overworked. Here again we can draw a comparison with the body. A man can work from 16 to 18 hours a day, thus putting through a lot of work in a short time, but eventually he breaks down and becomes an old man prematurely. A battery may be

overworked for a certain length of time, but its useful life is greatly shortened by such a procedure.

Many other points of battery care should be mentioned. However, it is not the intention to present a text book on storage batteries, but only to call attention to the essentials which, if followed, will insure maximum satisfaction from the storage battery and, therefore, from your electric plant.

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A beautiful and enduring roll roofing. Mineral-surfaced in red, green, or blue-black. Has rot-proof seal-back. Nails and cement in each roll. Very popular for bungalows, cottages, garages, and all farm buildings.

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Mineral-surfaced in red, green, or blue-black. Base of

best grade roofing-felt. These shingles are staunchly weatherproof, fire-resisting and need no painting. Size 8x12½ inches.

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Four shingles to a strip. Mineral-surfaced in red, green, or blue-black. Two sizes—10 inches and 12½ inches deep, both 32 inches long. The 12½-inch Multi-Shingle, laid 4 inches to the weather, gives three-ply roof—the 10-inch gives two-ply roof.

Everlastic Octagonal Strip Shingles

The latest in strip shingles. Mineral-surfaced in red, green, or blue-black. Afford novel designs by interchanging red strips with green, or red strips with blue-black.

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Barrett ROOFINGS

Orchard Problems and Their Solution



Edited by Paul C. Stark

Profits From Thinning Apples

Can you give me some concrete figures which show that thinning apples actually pays for the time and money spent? In principle, the practice is sound, but does it pay?—A. R. B., New York.

THERE have been reliable experiments in thinning fruit conducted at several of the State Experiment Stations and the results of a few of these should answer your question. In the first place, however, we must assume that all fruit will be picked from the tree in the event of thinning or not, so that the time required to pick off the inferior and worthless fruit would be the same in either case. Moreover, thinning can be done at a time of year when labor is easier to get, and, furthermore, high-priced labor is not required. But even more conclusive are records which show that the cost of picking unthinned trees is even greater in some cases than the cost of thinning plus the cost of picking the thinned trees. The main advantage of thinning comes in the great increase of large and A-grade fruit. The Ohio Station, working on the Rome Beauty variety, obtained an increase of 35 per cent of No. 1 fruit, with a corresponding decrease of 28½ per cent of No. 2 fruit and six and one-half per cent of culls.

A West Virginia experiment some years ago showed that increase in size of fruit may be very marked as a result of thinning. On unthinned trees of Ben Davis, it was found that over 65 per cent of the crop was less than two and one-fourth inches in diameter, while 34 per cent was between two and one-fourth and two and three-eighths inches. On the other hand, thinned trees of this variety gave only 13½ per cent of the fruit less than two and one-fourth, while 71½ per cent was between two and one-fourth and two and three-fourths inches and 14½ per cent was above two and three-fourths inches. In addition to this, and in spite of the greater number of apples on the unthinned trees, the thinned trees produced over twice the total marketable fruit of the others.

These experiments and many others show that size in particular can be increased by thinning. In addition to this, thinning will remove from the trees most or all of the small and diseased fruit, makes spraying easier and more effective, and also prevents the breaking of overloaded branches. In these days where a premium is being placed on large and first-class fruit, the elimination of the inferior grades before they reach the packing house will do much, perhaps more than any one orchard operation, with the possible exception of proper spraying, to increase fruit-growing profits.

upper surface of the leaf. Leaf spot first appears as a small purplish speck, which gradually enlarges and becomes sunken and yellowish brown in color.

On the lower surface of the leaf, the spots are not very noticeable. In severe cases, the disease will cause the foliage to turn yellow and results in leaf fall one or two months earlier than normal.

The disease is ordinarily controlled by spraying, but in addition to this, complete control must also include the eradication of black rot cankers on limbs by proper pruning and the removal of all infested fruit which might serve as sources for new infections. A moderate amount of pruning will also open up the tree, let in sunlight and lessen the opportunities for heavy leaf infections during wet weather. Cultivation is also very useful and important on account of the turning under of diseased fruit and leaves. The ordinary spray program, however, will usually keep the disease down so that no special sprays need to be applied.

Control of Apple Blotch

Will you please give me information about the apple blotch disease? How is it ordinarily controlled and when are the most important sprays given? Blotch seems to be getting more and more serious in my neighborhood and I would like to know how to eliminate it to the best advantage this season.—E. S. C., Kentucky.

THE PERIOD of infection for apple blotch occurs over a period of about five weeks, beginning about 10 days or two weeks after petal fall. It is during this period that the spray must be applied to control the disease. If the weather is rather wet and would thus favor the blotch, the control remedy must be all the more carefully carried out. Duchess (Oldenburg) is one of the most susceptible varieties.

Spraying is the most important thing in controlling apple blotch. The applications must be applied very thoroughly and at the proper time. Bordeaux Mixture is usually recommended rather than lime sulphur, although the latter has given good results in parts of Ohio. The ordinary Bordeaux spray used for blotch control is that made by the 3-5-50 formula.

The regular apple blotch sprays are ordinarily applied at intervals of two, four and six weeks after the petal fall spray (or calyx spray) is applied. As a rule, three applications are sufficient in the north, but as one goes further south and the season is longer, it may be necessary to make four or five applications of Bordeaux Mixture after the calyx spray to completely control the blotch. For your section, probably four sprays would be sufficient, applying at intervals of about 12 days during the period when most of the infection takes place.

Frog-Eye Leaf Spot on Apple

Can you give me any information on the treatment of "frog-eye" on apple? This disease was rather severe on some of our apple varieties last year.—H. B. P., Pennsylvania.

THE LEAF disease known as "frog-eye" is nothing more than a form of the common black rot of apple. This disease on the leaves is noticeable shortly after they unfold, and the condition usually remains to the end of the summer. A single leaf may have one or several spots, which may be either scattered or grouped on the

Woolly Aphis on Young Trees

Some of my newly-set apple trees are affected with some trouble which shows itself as conspicuous white cottony patches. What is this and how may it be controlled?—S. E. C., Maryland.

WITHOUT a doubt your trees are affected with Woolly Aphis. This insect is sometimes very troublesome, particularly on young trees. It should be checked promptly by spraying your trees with a mixture of soap and nicotine. This spray should be applied whenever Woolly Aphis makes itself evident.

Chuting Blueberries

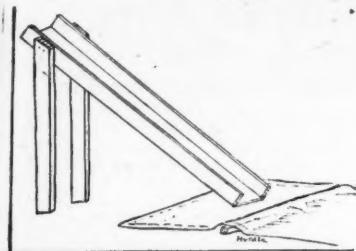
by Virginia Zimmer

"IT TOOK my wife and the girls so long to pick over the berries that they were tired before the canning was started," is the way "Uncle" Dan Thompson of Danola Lodge, Northome, Minn., explained the need which led to the invention of his blueberry chute which he was setting up one morning on the lawn back of the house. Danola Lodge, on the shore of one of the northern Minnesota lakes, is a group of summer cottages with a central community hall and dining room, where the outdoor life makes necessary the provision of large quantities of foodstuffs, including canned fruits and vegetables.

"And besides that," he continued, "the berries grew soft and mushy, and had to be thrown away before we could finish with the quantity we needed to put up. This way it takes only about a third of the time and the berries are in better condition."

As he spoke he was putting in place a long chute constructed of plank about 10 feet long and eight inches wide, with side uprights of boards six inches wide. The upper end was supported on a standard, or sawhorse, about waist high or a little above. The lower end rested on a sheet or large canvass placed on the ground, and under this, a few inches from the foot of the chute, was a small strip of wood an inch or more high, to act as a hurdle for the berries.

About an hour later I saw the chute in operation. An old Indian drove up in a dilapidated Ford with a number of crates of berries on the rear, which he deposited on the door step. Mr. Thompson quickly opened the crates and gently poured the contents into the upper end of the chute. As the berries rolled down the incline, the more perfect of them struck the hurdle and jumped two or more feet to



Blueberry Chute.

the other side of the canvas. Others, not so large or perfect, jumped only a few inches into another pile, while the softer ones with leaves and small stems adhere to the sides or base of the chute, and were readily picked over by hand and the refuse discarded. The neatness and dispatch with which the separation was performed made it possible to use the select fruit for preserves and canning and the poorer quality for jams and jelly.

The chute could be used for any firm fruit, but is especially adaptable to blueberries, gooseberries, etc., and its simplicity and inexpensive construction make it worth many times its cost in the labor and time it saves, where a large quantity of fruit is to be preserved.

Eliminate the Middleman

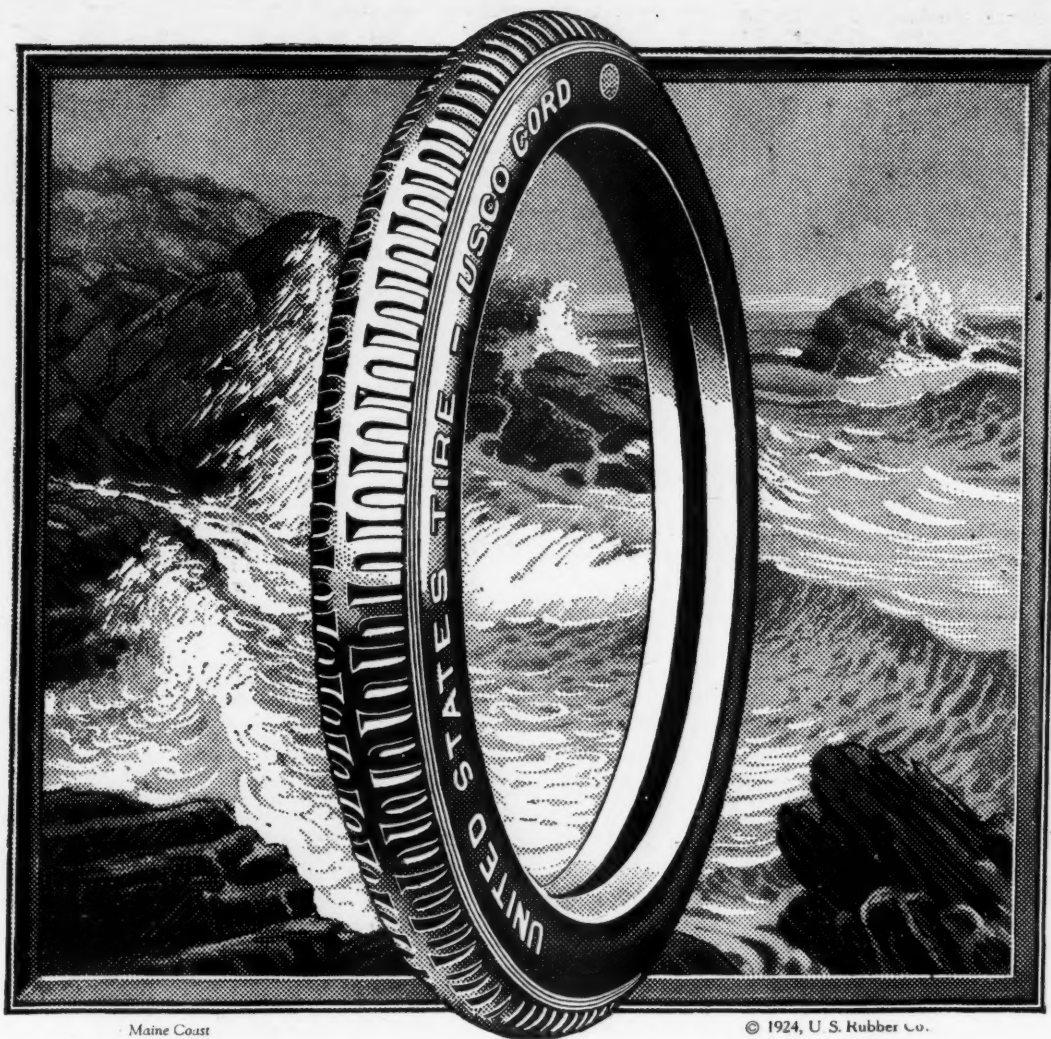
Farmer: "Hello, is this the undertaker? Well, hurry right over, my wife is terribly ill."

Solemn Voice: "You don't want me, you want a doctor. I'll be over when the doctor gives up."

Farmer: "No, I don't want any doctor. I want you. I belong to a co-operative marketing organization and we believe in cutting out the middleman."—California Citrograph.

"The next person who interrupts will be expelled from the court," said the judge sternly.

"Hooray!" shouted the prisoner.—Pacific Rural Press.



Maine Coast

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IN the several months that USCO Cord has been under national scrutiny the car owner has seen the upsetting of every former meaning of tire value in the low-priced cord field.

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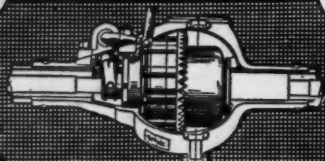
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(P.C. Benzene) 1-lb. \$1; five-pound tin, \$3.75; with directions. From your dealer, post paid direct, or C.O.D. Agents wanted. **Dept. D, HOME PRODUCTS Inc., Rahway, N.J.**

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MYERS PUMPS



With the Co-Ops.

Edited by C. E. Bassett

THE MICHIGAN Sweet Cherry Growers' Ass'n has been organized at Beulah, with O. E. Hawley of Shelby as president; Everett Whitney of Traverse City, vice president, and A. L. Finch of Beulah as secretary-treasurer.

The organization was formed primarily to serve the sweet cherry interests, but as all of its members also grow sour cherries, it will collect and disseminate data on the sour fruit as well as the sweet. Headquarters of the association will be in Beulah and members will report crop prospects, sales and offers, and daily shipments to the secretary for compilation and redistribution to the members through the local co-operative associations.

Each night during the marketing season the manager of local co-operative associations will wire a report on the shipments of cherries for that day, giving the number of crates sold and the markets to which shipped. With this information in the possession of each member, the association believes the growers can make intelligent sales and can avoid glutting markets with their fruit. The bulk of the sweet cherry crop went to Milwaukee and Chicago last year and the returns were very unsatisfactory. The situation will be relieved this season by making carlot shipments to distant markets like Boston, New York, Washington, Baltimore, Cleveland and other large cities. These sales will be made by individual growers or co-operators, and not by the state association, and the sales agency, it was indicated, probably will be the Wolverine Fruit and Vegetable Exchange of Grand Rapids.

Membership in the association was thrown open to all growers of sweet cherries and to co-operative agencies handling cherries. Those which have signified intentions of joining are the Grand Traverse Canning Co., Traverse City; Benzie Co-operative Marketing Ass'n, Beulah; Onokama Farm Bureau Local, Onokama; Shelby Co-operative Ass'n, Shelby; and Hart Co-operative Marketing Ass'n, Hart.

Michigan sweet cherry growers have little competition in the markets other than the fruit produced on the Pacific coast. The crop in Michigan is produced in a narrow belt along the east shore of Lake Michigan and the production is so light that the growers feel that more intelligent selling of futures and more orderly distribution of the fruit at harvest will make the industry more profitable and furnish the necessary incentive to plant large blocks of trees.

A LARGE increase in membership is reported by the California Walnut Growers' Ass'n, Los Angeles, Calif. Three large new locals have been added within the last few months, making a total of 44 local growers' associations affiliated with the central organization. These three locals will bring about 700 tons of walnuts into the association. The additional acreage of bearing trees is 2000, besides a large acreage of young trees soon to come into bearing. This gives the central body control of 87 per cent of all the walnut acreage of the state, and brings 84 per cent of all the walnut growers of the state into the membership.

A CALL to the Fourth Co-operative Congress has been issued by the Co-operative League, 167 West 12th street, New York. This congress will be held in New York City, November 6, 7 and 8, 1924. Each society which is a member of the Co-operative

League is entitled to one voting delegate, also one additional voting delegate for every 500 members above the first 500. Societies are urged to send as many non-voting representatives as possible. Various types of societies which are not members of the Co-operative League but are interested in the co-operative movement, including agricultural marketing and service societies, are invited to send fraternal delegates, and to such delegates the courtesy of discussion will be extended.

SINCE its organization in 1909, the Florida Citrus Exchange, Tampa, Fla., has sold over 31,000,000 boxes of citrus fruit for more than \$80,000,000. The first year of its existence, the exchange handled 1,482,359 boxes, which were sold for nearly \$2,000,000. During the season of 1918-19, the 2,000,000 mark was passed as regards number of boxes handled, and the following year the 3,000,000 mark. Over 5,000,000 boxes were delivered to the exchange during the season of 1922-23. The increase in volume of business is largely the result of increased production, which has nearly doubled since 1918, the total carlot shipments from the state for that year being 17,473, as compared with 30,515 in 1922.

The number of boxes handled by the exchange and the gross selling value of the fruit handled during 14 years are given below:

Season.	Boxes Shipped.	Amount of Business.
1909-10	1,482,359	\$ 1,986,361
1910-11	832,310	1,373,311
1911-12	741,917	1,639,636
1912-13	1,780,301	2,489,389
1913-14	1,481,471	2,711,091
1914-15	1,945,602	2,762,754
1915-16	1,735,422	3,401,427
1916-17	1,289,984	2,592,867
1917-18	1,184,711	4,099,100
1918-19	2,238,084	7,878,055
1919-20	3,770,511	12,706,622
1920-21	3,905,841	10,350,478
1921-22	3,805,942	12,064,826
1922-23	5,205,510	13,823,676
Total	31,400,365	\$80,879,603

PERCENTAGES showing the amount of the total agricultural co-operative business transacted by farmers in the various geographic divisions of the United States, indicate in which sections of the country the co-operative movement is developing most rapidly. These percentages show that during the nine years, from 1915 to 1923, co-operation, as measured by amount of business, gained in relative importance in the Atlantic Coast States and the South Central States, and that it lost in relative importance in the North Central, the Pacific and Mountain States, as will be noted by the figures below:

Geographic Divisions.	1915. ^a	1919. ^b	1923. ^c
West North Central	45.1	42.6	28.9
Pacific	23.7	19.7	18.8
East North Central	14.2	18.2	15.4
Middle Atlantic	8.8	8.4	12.5
Mountain	3.2	2.6	1.9
South Atlantic	1.6	2.9	6.6
West South Central	1.2	3.7	4.2
East South Central	1.1	.8	8.6
New England	1.1	1.1	3.1
Total	100.0	100.0	100.0

^aEstimated business for 5424 associations reporting to the Department of Agriculture was \$335,838,684. The total business was probably slightly greater than the above figures.

^bSales and purchases through co-operative associations for 624,527 farms was \$806,599,308, as reported by census enumerators.

^cEstimated business for 10,160 associations reporting to the Department of Agriculture was \$2,200,000,000. The total business was probably slightly greater than the above figures.

As buying and selling by farmers through co-operative associations first

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developed in a large way in the North Central, the Pacific and Mountain States, the changes indicated by the percentages have no special significance. The figures only make clear the fact that in those sections of the country where the farmers have been backward in engaging in co-operative buying and selling, the idea is slowly gaining a foothold.

Perhaps the matter of greatest significance in connection with the above percentages is the close agreement between those derived from Department of Agriculture data and those derived from Bureau of the Census data, although these data were obtained by very different methods.

THE CALIFORNIA Pear Growers' Ass'n now has 1313 members. Receipts have run as high as \$118,200 in 1922, while operating expenses have run as high as \$30,000. For the purpose of increasing the consumption of pears by advertising, the sum of \$53,000 was accumulated. The president stated: "By advertising pears, fresh, canned and dried, demands can be created that will take care of the increased crops now staring us in the face." Sales have run as high as \$1,293,802 and not a penny was lost because of bad debts during the first three years. The season of 1923 closed with \$122,000 in the several reserve funds. In suggesting a policy for the future, the president stated: "What we Californians need is the establishment of the California fruit food habit among all the people of the world. It will take some time to establish this, but the sooner it comes, the better for all of us." Which suggests to the writer the thought, why let California do all of the fruit advertising. Haven't other sections some surplus fruit to sell?

THE CALIFORNIA Fruit Growers' Exchange had the problem of getting rid of perfectly sound but odd-size oranges and lemons at a profit. They developed, manufactured and sold 12,000 electrical fruit extractors for soda fountains and hotel kitchens. They squeezed and sold the juice from 1500 carloads of citrus fruit this way last season. That shows how a big co-operative can conceive and carry out selling ideas that an individual farmer would never think of, and could not carry out if he did.

FROM Seattle comes the report that incorporation of the Pacific Northwest Fruit Exchange and the naming of Spokane as the location for the central offices of that body has not entirely cleared up the situation in regard to the organization of the exchange. Differences of opinion between the bankers and grower-shipper co-operative organizations is given as one of the main reasons for this delay. It appears that the banker backers of the exchange are opposed to letting the sub-exchanges exercise any of the selling rights, while the Yakima Valley groups and the Wenatchee organizations are declared to be unwilling to consider such an arrangement. The result has been to bring recommendations from Wenatchee and Yakima growers to the effect that a new clause covering the selling activities be inserted in the agreement before they are willing to sign up with the new deal. It is stated that, should the protesting groups fail to sign up, it will take about 4000 carloads of fruit away from the exchange and thereby materially cripple its first season's operations.

Recent Comments on Co-operation

Farmers have learned that farm prosperity lies in organized marketing that will substitute the principle of marketing for dumping.—**Carl Williams, President, American Cotton Growers' Exchange.**

The farmer will get a fairer return for his labor when he intelligently merchandises his products through his own adequately trained and equipped sales bureaus.—**John E. Owens, Pres-**

ident, First National Bank, Wills Point, Texas.

We speak of co-operative marketing. The Dane speaks of co-operative agriculture and looks upon marketing as only one element in the co-operative enterprise.—**E. E. Montgomery, Chief Foodstuffs Division, U. S. Department of Commerce.**

Local units should be strongly organized, should center on one commodity and avoid speculation. Co-operation is merely a way of doing business. It must produce economic results if it is to live and thrive.—**Charles J. Brand, Consulting Specialist in Marketing, U. S. Department of Agriculture.**

The farm problem is not a class problem. It lies at the root of our institutions. We are fundamentally an agricultural nation, set apart by Nature to that destiny. In times of stress we have often had occasion reverently to thank God for the American farmer with his sanity, his patriotism and his untiring energy. Let us honestly strive

to bring the farmer's dollar back to par. And the passport to this happy solution of our farm-marketing troubles is co-operation.—**Frank O. Lowden, former Governor of Illinois.**

The farmer is seeking the same sane and analytical solution of farm problems as is made in banking, manufacturing and other industries. Group production, group capital and group distribution are characteristics of normal industry today.—**O. E. Bradfute, President, American Farm Bureau Federation.**

People still governed by the antiquated idea that the main slogan of co-operative marketing is, "eliminate the middleman," will be amazed to learn that the modern co-operative marketing association frequently has the hearty sympathy of many middlemen in its field. In the majority of the cases, due to the superiority of product, the co-operative association is looked upon with decided favor by the retail merchant, and frequently by the wholesaler and the jobber who supplies him,

and by the NON-SPECULATIVE broker. That is because modern co-operative marketing draws the distinction between distributive and speculative middlemen. There is no such thing as totally eliminating the legitimate middleman. He is himself an essential producer. He produces a service which is necessary in the distribution of a product.—**Aaron Sapiro.**

A Correction

MR. HEPPNER, author of the article on "Growing Nursery Trees," in the June issue, has asked us to make a correction in it. In discussing the distance between rows, the article stated that the distance generally varies from four to six feet. The article should have stated that the distance "generally varies from three to four feet, the former being preferable where the area of ground is limited."

Dried fruit is more appetizing than it sounds. Long soaking is the thing that makes it good.

Do You Know About the Power Take-Off?

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THE Power Take-Off helps you use the McCormick-Deering Tractor not only to pull your machines but to run the mechanism of the machines by power conveyed direct from the tractor through a revolving shaft.

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The corn picker is one of the machines that demonstrates the value and efficiency of the Power Take-Off. Many corn fields will see its use this season. Grain binders [the new McCormick-

Deering 10-ft. tractor binder which cuts 30 to 40 acres in 12 hours], rice binders, spray pumps, etc., may all be run under difficult conditions, when the tractor power runs them as well as pulls them.

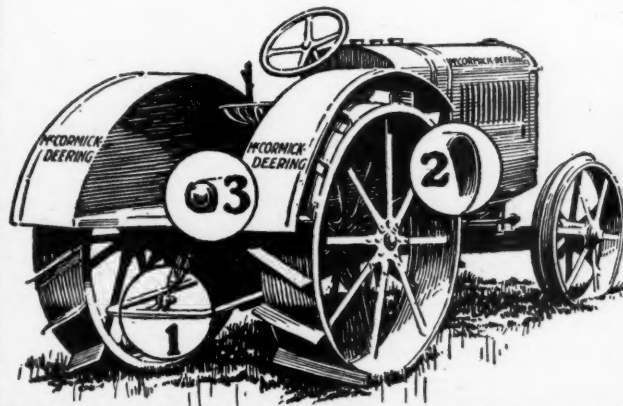
McCormick-Deering 10-20 and 15-30 are especially designed so that this useful equipment can be added. You may not need it right away but it is ready when you want it in years to come. Make sure the tractor you buy is made for the power take-off and you will find it has all these things, too—crankshaft and crankshaft ball bearings guaranteed for life, removable cylinders, unit main frame, ball and roller bearings at 28 points, throttle governor, belt pulley, platform, fenders and brake. Write for a catalog or see the dealer.

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Insect Enemies and Fungous Diseases of the Grape

(Continued from page 12.)

the other grape pests. In small gardens they can easily be removed by jarring the vines and holding underneath them a bucket containing oil. Early morning is the best time to practice this method of control, as the beetles are not so active as in the warmth of noon.

Grape Phylloxera

This is a well-known, and was not long ago a much dreaded, pest. It attacks chiefly grape vines with vinifera blood, and therefore it is advisable for those planting vinifera sorts to use only vines on resistant stocks. Much experimenting has been done both in this country and in France with a view to obtaining a resistant stock, and as a direct result, the pest is not so universally spread over the United States as it has seemed incapable of adapting itself to any other food supply. The Phylloxera causes rough, wart-like galls on the leaves and small knots upon the roots, resulting in slowly dying vines.

FUNGIOUS DISEASES

These diseases are likely to be very prevalent during hot weather accompanied with excessive moisture, and

are likely to affect any vines which are not in good physiological condition. Consequently the necessity for good, clean cultivation, together with the cutting out of all dead arms well below the affected parts, cleaning up and burning of all leaves, etc., cannot be too highly emphasized.

Black Rot

This attacks shoots, leaves and fruit, and on the former it shows as reddish-brown spots, while on the latter it causes a shrivelling up of the fruit.

Downy and Powdery Mildew

These produce somewhat similar effects such as their names imply and they, together with black rot, may be controlled by spraying with Bordeaux. When powdery mildew occurs on vinifera grapes on the Pacific Coast it should be dusted with sublimed sulphur. This should be applied when the young shoots are about half a foot long and again when the blossoms appear.

Anthraxnose

This disease causes the leaves to develop sunken, brown spots which later fall out of the leaf. On the fruit the spots are brown also but have a purplish margin. Cankrous shoots should be cut off and burned during winter, and the vines should be sprayed in early spring before growth starts with lime sulphur (1-9) or during the spring with Bordeaux mixture.

Markets and Marketing



Edited by C. E. Bassett

FINAL settlement for the 1922 apricot crop has been made by the California Prune and Apricot Growers' Ass'n, San Jose, Calif., as of November 30, 1923. An explanatory statement has been prepared by the Growers' Information Bureau of the association and published in the Sunsweet Standard for April. Total revenue credited to the 1922 apricot pool amounted to \$2,702,095, and net revenue to \$2,046,410, of which amount \$1,723,731 was advanced to growers. The final amount credited to growers was \$302,606. Of the above amount \$20,072 was used for the retirement of preferred stock in the Growers' Packing and Warehousing Ass'n, Inc., common stock of the warehousing association being issued in the name of the grower members.

Total expenses amounted to \$655,684, or 24.27 per cent of total revenue. Some of the larger items of expense were as follows:

Concentration:
Labor, freight, hauling, handling, etc. \$13,890
Receiving, grading and sorting 3,062
Processing and packing 270,967
Sales, freight and hauling 53,324
Storage 10,592
Advertising 42,411
General insurance 19,964
Brokerage 63,123
Discount 48,552
Selling deduction (3 per cent of gross resale proceeds) 80,233

February sales of apricots of the 1923 crop totaled 3,600,000 pounds, and March sales were 2,726,000, leaving unsold stocks of less than 2,500,000 pounds, which is not more than five per cent of the total output for 1923, the largest crop on record.

Sales of prunes in March amounted to 14,043,350 pounds and a payment to prune growers was authorized by the executive committee. Sixty per cent of these sales were for export. Efforts are being made to clean up the 1923 crop before the new fruit comes to the packing houses, and an intensive advertising campaign is being conducted. During March, the association carried advertisements in 147 newspapers and seven magazines, besides having specialty men in the field, while brokers and wholesalers were assisting in the campaign.

Payments made by the association during March included a return of \$650,000 borrowed from the banks, \$27,639 to the prune growers, \$281,649 to the apricot growers as a final payment on the 1922 crop, and \$379,245 to the apricot growers as a second advance on the 1923 crop. Bank loans were \$1,200,000, as of April 1.

When the April number of the Sunsweet Standard went to press, A. M. Mortensen, general manager of the association, was leaving for the East to keep in touch with the trade and to observe the reaction to the advertising campaign which was then at its peak and on which the association had staked a considerable amount.

RECENTLY collected data relative to the pooling practices of 476 associations handling fruits and vegetables, indicate that seasonal pools by variety are the most popular. Over 46.2 per cent of the associations reporting use this type of pool. The percentage of associations handling some of the more important products through seasonal pools are as follows: Apple associations, 87.1 per cent; cranberry, 80 per cent; sweet potato, 80 per cent; peach, 71.4 per cent; grape, 57.1 per cent; citrus fruit, 30.6 per cent.

Following the variety seasonal pool

in popularity comes the weekly pool, then the monthly pool and the daily pool. The per cent of the 476 associations pooling the returns received for products shipped during periods of different lengths, are as follows:

Length of Pool	Per Cent
Season	46.2
Week	11.6
Day	10.3
Month	10.1
8 to 15 days	6.3
2 to 3 days	4.8
Other periods	10.7
Total	100.0

The daily pool is the most common with the strawberry associations, 59.2 per cent employing this type. Five of the six watermelon associations reporting pool returns over periods of two and three days. The 48 potato marketing associations reported pooling periods as follows: One day, seven associations; two to three days, six; one week, 14; 8 to 15 days, four; one month, five; one-third of a season, two; semi-seasonal, one; seasonal, nine.

Of the 39 associations handling apples, one reported a pooling period of two and three days; four, a period covering one-half of the season; and all the others reported seasonal pools.

SALES of cranberries in 1923 by the Pacific Cranberry Exchange, Astoria, Ore., reached a total of \$62,563, according to the report of the sales manager. Disbursements to members amounted to \$42,923, and the year closed with a cash balance of \$973. This amount was subsequently used to pay a patronage dividend of five cents a box on 19,808 boxes. The largest items of expense were: Freight, \$5308; brokerage, \$2187; and storage, \$1241. Reports of the two preceding years show sales of \$40,000 and \$60,000 respectively.

The sales manager states that although satisfactory returns were made in 1921 and 1922, there were no new members in 1923 and a number of the old members dropped out of the ranks. As the exchange controls less than half the crop on the coast, the marketing situation is very difficult and unless a nearly 100 per cent membership can be secured, it will become necessary to sell cranberries on an f. o. b. basis. The manager, in discussing the marketing problems of the 1923 season, said: "Wholesalers being offered cranberries from so many different sources, bought very sparingly, and in some instances would not handle the fruit at all. There was never any buying of cranberries in anticipation of future needs. . . . Contrary to the usual history of cranberry marketing, there was no progressive step up in prices as the season advanced."

A SUCCESSFUL year for the strawberry growers is reported by the Central California Berry Growers' Ass'n, San Francisco, Calif., for the year 1923. At the same time, the season was disastrous for the growers of loganberries, and very unsatisfactory for growers of blackberries and raspberries. Production of strawberries was somewhat lighter than for the past two seasons, and the cannery demand was good, with the result that prices kept up well during the season. The market for other berries, especially loganberries, was greatly affected by a virtual boycott on sugar, many housewives absolutely refusing to can or preserve. Demands of the canneries were very light. More than a thousand barrels of strawberries, raspber-

ries and loganberries were processed at the San Jose plant. The former two varieties were sold but practically all the loganberries remained unsold at the end of the year.

During the last five years, over 800,000 sixty-pound chests of fruit have been handled by the association. About 73 per cent of the total quantity was strawberries; 11 per cent was blackberries; eight per cent loganberries; and eight per cent raspberries.

FIFTEEN local canning-crops associations have been formed in Indiana, with prospects of others to be formed in the near future. It is proposed to form a local canning-crops association in every community of the state which furnishes produce to canning factories, then to federate the locals into the Indiana Canning Crops Exchange. More than the required minimum volume of business has been secured and the organization work is making rapid progress. A marketing contract providing for sale of products by the producer to the local association is being used.

THE WESTERN North Carolina Fruit Growers' Ass'n met in Hendersonville recently and discussed problems connected with marketing the apple crop. The resignation of Boling Hall as secretary was accepted and H. R. Niswonger was elected to succeed him. Directors were elected as follows: H. A. Corriher, W. H. Moorehouse, Colonel Johnson of Asheville, J. B. Bledsoe, H. P. Corwith, John S. Bowen and H. R. Niswonger. Mr. Corwith is president of the association.

James G. McClure, Jr., reported for the committee on marketing. Quite a discussion followed on the necessity of good organization work that would result in better methods of co-operative marketing.

H. A. Corriher, Dr. J. S. Brown and E. F. Arnold were named as a committee to make investigations as to local facilities for keeping apples in cold storage and to see about a packing shed. The fruit growers are unanimous that more attention must be given to the scientific treatment of their orchards.

WHEN you grade a product so that the consumer can get exactly what he wants and does not have to take with it a lot of junk that he does not want, you are increasing the value of that product to the consumer. When you make it wholesome and attractive in form, when you furnish guarantees of quality with it, when you educate him to a score of uses that lie in that product which he did not know before, you very distinctly increase its value to him. Unless you can make him recognize that increase of value by such methods, you must give him the product for less money.

THE FIRST carload of early cherries from Napa county, Calif., which were sold in New York this year, brought the growers \$4897, according to announcement made by the shippers. The carload was shipped May 10 and contained more than 20,000 pounds of fruit. The varieties represented in the car were Rockports, Tartarian, Chapmans and Bings. This is said to be the first carload of pre-cooled cherries to be shipped from northern California.

EXPERIMENTS in a system of delivering fruit by dates were conducted in four plants in 1923 by the Sun-Maid Raisin Growers, Fresno, Calif. Preliminary figures indicate that receiving costs averaged 60 cents a ton for all plants, a considerable reduction. At the four plants which were operating under the date delivery system, the average cost of receiving raisins was 50 cents a ton, or 10 cents less than the average. Among the advantages of the date delivery system, in addition to economy of operation, the following are given: The maximum tonnage which may be received at a plant in one day is greatly in-

creased; the plant superintendent has an opportunity to plan his work and schedule deliveries of certain kinds of raisins on certain days, as well as to plan for just the right amount of help; it is a saving of time and money for growers to know just when they can deliver their crop. The management hopes to see the date delivery system generally adopted in 1924 operations.

THE INCOME of the California Grape Growers' Exchange, San Francisco, Calif., for the year ending December 31, 1923, was \$31,704. Over \$21,000 of the total came from commissions in payment of marketing services. The expenses for the year were \$45 in excess of the income. The chief items among the expenditures were: Salaries, executive and office, \$11,900; field expense and canvassing, \$9920; office expense and printing, \$4759; directors' per diem and expense, \$1623; and advertising, \$586. There was a balance of \$10,487 in the surplus account at the close of the year, this surplus having been accumulated in previous seasons.

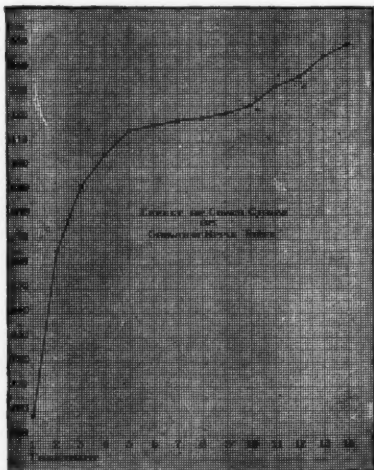
The tonnage of the association for 1924 is expected to approximate 40,000 tons of fresh grapes. Last season for the first time the association provided its members with box shooks. This association, which was organized in 1920, is a noncapital-stock corporation, engaged in serving its members as a marketing agency.

Comparative Rating of Cover Crops

by J. A. Middleton

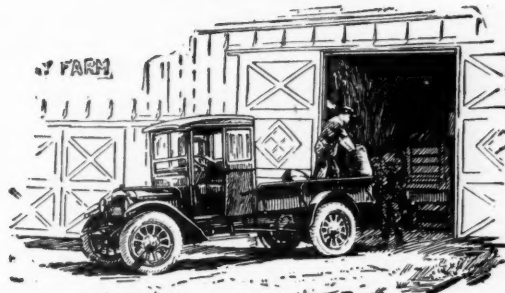
MOST orchardists agree that their trees and soil are benefited by the use of cover crops, but I wonder how many have been observant enough to realize the ones which give the best results. Such crops as crimson clover, buckwheat, rye, etc., are planted almost universally, and it is my purpose in writing this paper to show that they are not equally effective in producing growth. It is conceded that a heavy growth of vegetation is considered a valuable measure of the effectiveness of a cover crop for the orchard. Due to the fact that getting comparative results of new growth from the twigs is very difficult and subject to criticism, it was decided to let the increased trunk growth be the indicator.

Before discussing the experiment, it might be wise to say a little about cover crops. They are divided into two distinct classes: Leguminous, such as vetch, clover and alfalfa, and non-leguminous, such as rye, buckwheat and rape. Leguminous crops are usually recommended in preference to non-leguminous ones as they add nitrogen to the soil and are supposed to give better results. However, this will not hold in the experi-



Explanation: 1—Sod; 2—alfalfa; 3—winter vetch; 4—rye; 5—soy beans; 6—summer vetch; 7—purple top turnips; 8—mammoth red clover; 9—barley; 10—crimson clover; 11—Dwarf Essex rape; 12—Canada Field peas; 13—buckwheat; 14—Cow Horn turnips.

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ment which is explained in the following paragraph. To sum up the benefits derived from planting cover crops in the orchard: They add humus to the soil, thereby reducing to some extent the addition of commercial fertilizers; they prevent washing of the land; prevent soil from extremes in temperatures; improve the texture of the soil; and increase growth and yield. Many other advantages of a cover crop might be cited, but these are the most important.

One of the best illustrations of the comparative rating of cover crops in general is an experiment which has been carried on at the Massachusetts Agricultural College. Here they had three acres of land planted to Wealthy, McIntosh and Baldwin trees and the following cover crops were divided into the plot system to test out their effectiveness in producing growth: Buckwheat, summer vetch, crimson clover, mammoth red clover, soy beans, alfalfa, winter vetch, barley, Canadian Field peas, Cow Horn turnips, Dwarf Essex rape, rye, sod and purple top turnips.

The orchard was set in 1912 and buckwheat was used on the entire plot, and in 1913 soy beans were planted as a cover crop. In 1914 the orchard was divided into sections and the testing out of the different cover crops was started. There were two plots of each crop placed in different sections of the orchard. It was deemed necessary to have two plots of each cover crop in order to check up on any soil variations that might be present. Each plot was given the same attention and nothing was removed. In the case of sod and al-

falfa, the crop was cut but was not removed from the plot. Some commercial fertilizer was added the first four years, but care was taken to see that each plot and tree received the same amounts. A small tack was driven in the trees about two feet from the ground so as to be sure that the readings of the increased growth would be taken at the same place each year. These readings were taken every year from the start until the trees had borne several crops.

The growth of the trees subjected to the different treatments show some very interesting results. In other words, it points out conclusively that some crops are much better than others for producing growth. An idea of the variations in growth may be seen in the chart. Here we see a difference of 150 millimeters in trunk circumference between the sod and Cow Horn turnips, and almost 100 millimeters difference between alfalfa and Cow Horn turnips. The trees on the sod plots had a sickly appearance, the leaves were yellow and one could easily reach around the trunk with his fingers. They had an appearance of being about four years of age, when in reality they had been planted for 10 years. Sod reduces yields, growth, encourages mice, insects and diseases, and encourages neglect. Alfalfa produces a little better growth but its effects are somewhat similar to sod.

From the data, one would naturally conclude that Cow Horn turnips and buckwheat give the best results, and then follow Canada Field peas, rape and crimson clover, the latter three having about the same rating.



No. 2058—Charming Summer Frock, That's Easy to Make.

This frock cuts entirely in one piece as shown in the accompanying diagram. Cut in sizes 16 years, 36, 38, 40 and 42 inches bust measure. Size 36 requires 3 yards of 36-inch material with 4 yards of ruffling.

No. 1957—The Vogue for Pleats Is Exploited in This Good Looking Design. Cut in sizes 16 years, 36, 38, 40, 42 and 44 inches bust measure. Size 36 requires 2½ yards of 36-inch material with 1½ yards of 24-inch contrasting.

No. 2113—One-Piece, One-Hour Dress. This good looking design cuts all in one piece as shown in the diagram. The sides are laid in pleats to give a graceful width to the straight skirt. Cut in sizes 16 years, 36, 38, 40, 42 and 44 inches bust measure. Size 36 requires 3 yards 40-inch material with 1½ yards binding.

No. 2079—Smart Blouse for Summer Wear.

This blouse would be pretty made in a plain or printed silk crepe, flannel or fancy cotton material. Cut in sizes 14 and 16 years, 36, 38, 40, 42, 44 and 46 inches bust measure. Size 36 requires 1½ yards of 40-inch material with ¾ yards of binding.

No. 2037—Two-Material Dress. Cut in sizes 34, 36, 38, 40, 42 and 44

inches bust measure. Size 36 requires 2 yards 36-inch material with 1½ yards of 36-inch contrasting and 2½ yards of ruffling.

No. 2127—One-Piece Romper for Tiny Folk.

This practical romper is a splendid garment for warm weather play hours. It cuts, as you will notice in the accompanying diagram, all in one piece. The pattern comes in sizes 1, 2 and 3 years. Size 2 takes 1½ yards of 36-inch material with 2 yards of binding.

No. 2051—Kitchen Apron That Cuts All in One.

Here's an apron you'll like for it's easy to make, easy to launder (can be opened flat, as shown in the accompanying diagram, to iron) and easy to look at if made in colorful gingham, printed percale or muslin. Cut in sizes small, medium and large. The medium size takes 2 yards of 36-inch material with 7 yards of trimming.

No. 2082—A One-Piece Dress for Warm Weather Wear.

The diagram shows how the dress looks before the seams are taken. Cut in sizes 16 years, 36, 38, 40, 42 and 44 inches bust measure. Size 36 takes 3 yards 40-inch material with 4 yards of ribbon.

No. 2128—Little Girls' Bloomer Dress. Cut in sizes 2, 4, 6 and 8 years. Size 4 takes 2½ yards 40-inch material.

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Loganberries in Puget Sound Country

by W. A. French

THE LOGAN blackberry, commonly called the loganberry, has been quite extensively planted in the Puget Sound country during the last few years. Large plantations are now coming into bearing in Clallam and Jefferson counties, and in all parts of the Sound country many smaller tracts have been planted. The mild winters of this region and the comparatively cool, dry summers are favorable to the culture of the loganberry. Plantings east of the Cascade and Sierra Nevada mountain ranges have not proved satisfactory, as zero weather is usually fatal to the canes.

In districts where zero weather prevails, the loganberry can be grown by laying the canes on the ground and covering them sufficiently with straw or hay to protect them from freezing; but this additional labor is not always justified in a financial sense. As the canes are very brittle in the spring, the task of placing them on the wires is quite a difficult one. The loganberry has been tested in the South but, as a rule, with indifferent results. Hence its true habitat seems to be that portion of the states of the Pacific Northwest lying west of the Cascade and Sierra Nevada mountains.

Ordinarily, the loganberry suffers no winter damage in this climate, but last winter, at the end of December, a hard freeze occurred which winter-killed a considerable part of the canes in the Willamette valley in Oregon, and in the northern part of the Puget Sound basin. During the month of April the indications were that the crop this season would be below normal.

The Puget Sound planters of the loganberry have been encouraged to put out large acreages owing to the fact that the area favorable for the growth of this variety of blackberry is comparatively limited. All localities which have zero winters, and this includes the greater part and the most populous part of the United States, are unsuited to this plant. Hence a practically unlimited market is available for the output of the loganberry acreages of the Pacific Coast states.

The Logan blackberry was originated by Judge J. N. Logan, of Santa Cruz, Calif., and at first he believed it to be a hybrid of the Auginbaugh blackberry and a red raspberry which grew side by side in his garden. Recent investigations by the Agricultural Department, however, have made it reasonably certain that it is a variety of the Pacific coast form of trailing blackberry, and should therefore be termed a blackberry. Wild forms of the trailing blackberry of the Pacific coast occur which bear red fruit; the Logan, therefore, in the opinion of the Agricultural Department investigators, is considered a red-fruited variety of the blackberry.

Several large growers whom I interviewed had never even heard of the Agricultural Department's statement regarding the Logan blackberry. Thus slowly do the findings of horticultural investigators gain a hearing, to say nothing of receiving popular endorsement.

Regardless of the position taken by the Agricultural Department as to the origin of the Logan blackberry, popular usage has adopted the term loganberry. Popular opinion also seems to hold that the loganberry is more closely related to the raspberry than to the blackberry. Right or wrong, popular usage generally has the better of an argument. Hence the plant is almost invariably referred to as the loganberry.

About 8000 acres are planted to loganberries in the Willamette valley in Oregon and the Puget Sound country in the state of Washington. There are considerable plantings also on Vancouver Island, just across the international boundary in British Columbia.

The loganberry requires a fertile, well-drained soil with adequate mois-

(Concluded on page 22.)

'Z'

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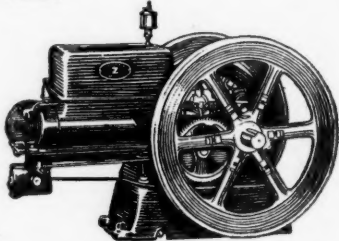
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The Orchard Home Department

When Doctors Disagree

THOSE nervous invalids who run to the doctor every time they sneeze and who eagerly take up each new health fad as it comes along must often get rather uncomfortable jolts to their confidence in the infallibility of physicians. Doctors, like all progressive men, build upon the ruins of outworn practices.

The rheumatic sufferer, who was put upon a strictly meatless diet years ago, may later have been fed on rare beef by the same practitioner and, if he live long enough, perhaps that savory morsel may again be snatched from him.

During one painful period, water was forbidden with meals. It diluted the gastric juice. Now it promotes the flow. Some professional enthusiasts trained their patients to drink quarts, yes, gallons, of water daily. Now they say, "Beware! If you have a tendency to this, that or the other malady, too much water constitutes a grave menace to your health."

It was settled long ago that the very dangerous tropical disease called Sleeping Sickness was caused by the bite of the tsetse, an African fly. England has few flies of any kind, and none of the supposed offenders, yet sleeping sickness is spreading there to a somewhat alarming extent. Dr. James Oliver, F. R. S., thinks it is probably a nutritional malady.

Yet when we reflect how darkly locked within us are the ailments of mankind, isn't it astounding how much has been done? Think of the dreadful scourges, such as smallpox, malaria and tuberculosis, that have been practically wiped out over great areas of the earth.

Though medical progress through the ages may be likened to that of the unfortunate frog, who figured distressfully in our early studies as scrambling up three feet from the bottom of the well, only to fall back two feet ten and one-half inches, yet we recall that at last he reached the light.

Patients now rejoice exceedingly that less and less reliance is placed on nauseous drugs and more and more stress placed on good health habits and a sane and healthy mental attitude. Put your trust in fresh air, exercise, sleep, rest, sanitation, hygiene and proper nourishment if you would avoid disaster. But if disaster overtake you in spite of these precautions, run for the doctor, God bless him.

Patience Called a Vice

A NEW and original point of view is refreshing. It captivates our fancy even if it fails to convince our judgment; but in that case it soon loses its charm.

Many mothers lately saw an article by a popular woman writer in which she deplores the quality of patience as being not only despicable but detrimental. That's a new viewpoint. The patient mother, it appears, is not to be praised but blamed. "It's the impatient mother with the heavy hand" who wins not only the respect and obedience but the love of her children.

I wonder. It seems to me that the very essence of the best maternal influence is loving patience. That does not mean overlooking or excusing faults, but having the patience to correct them, gently, firmly, persistently.

Which method is really more effective in teaching children that consideration for others which is essential to a social being like man? When the joyous, eager, thoughtless boy dashes through the house slamming all doors behind him, shall we let out a yelp of impatience, drag him back by the slack of his trousers and administer a hearty box on the ear, or shall we patiently point out the selfishness and discourtesy of an act that offends others?

The youngster who fears a scolding

and a blow may learn not to slam doors, but aside from foregoing that single act, what has he learned that may profit him as applicable to the right conduct of life?

When you have shown impatience toward a child are you satisfied with yourself and with the effect of your harshness, or do you feel regret and the conviction that other methods would have brought better results? What do you mothers think? I'd like to know.

Why We Should Read Novels

THE MAN or woman who reads nothing but fiction is a pretty poor type of reader, but the person who reads none is far from a well-rounded one. I'm sure you who read this take keen delight in a good novel, and there's no reason I can see to blush for that.

"The greatest study of mankind is man," and some of the finest character studies are found in novels. It has been very well said that, while the excessive and indiscriminate reading of novels good and bad may be likened to mental drug-taking, a more careful selection will prove a mental tonic.

The novel may be, and often is, a fine example of literary style and gives an illuminating insight into human nature and the motives of action and endeavor. I venture to guess we may go further in learning the invaluable lesson of understanding our fellow-men through reading a great novel that presents a real "slice out of life," than in any other way, save through actual contact with all sorts of people.

And what a wide variety of types is presented to us by the novelist, far wider than we can meet in our quiet rural lives. The brilliant novel brings romance, imagination, inspiration and a goodly share of information into the four walls of our houses. Its characters seem more real than some people we know. We laugh and suffer with them. The lesson taught may be more intimate to ourselves than any sermons.

But even if we reduce the novel to its least serious aspect, it is not to be scorned. Its power of entertainment has saved many a woman from an attack of "nerves" and brought sunshine indoors on many a rainy day.

More Marvelous Movies

WONDERFUL as appears the giving of motion to pictures, satisfied as most of us are with the illusion and beauty of screen productions, it is not enough. The fact remains that it is a picture still. It is flat, it has but two dimensions. Its figures have length and breadth but no thickness.

It was not to be supposed that modern science could rest inactive under this lack. Demetre Daponte, a young Roumanian inventor, devoted eight years to solving the problem, and now announces his success. Depth has been added to length and breadth.

It concerns the layman but little what the scientific process may be. What interests him is that the illusion of actuality will be greatly increased. His thrills will be more frequent and more real.

Some progress has already been made toward adding color and sound to the pictures. When these are perfected, we shall participate in the happenings of the screen to the fullest extent. Shall we enjoy them more than when we still had to fool ourselves a little?

The only three classes of people who live behind high fences are criminals, the insane and the very wealthy.

Voice of the Twentieth Century

HEAR the voice of the twentieth century, that soundless voice which fills the air about us, yet is dumb until science gives it utterance. Have you a little radio in your home? Perhaps you think of it as a luxury you may dispense with.

The luxuries of today have a way of becoming the necessities of tomorrow. Time was when glassed windows were so rare that the prosperous householder puffed with pride as he led his guests to peer through each pane, much as today he leads them to admire his new frescoes and paneling. Rents soared as landlords stressed the advantages of window glass. Not until within our own time has the bath room become a usual feature of the home. The number of baths is still found worthy of note; "800 rooms, 800 baths," boasts the de luxe hotel of the great city.

A new trend is shown by the advertisements of apartment houses in course of construction. "Every apartment with radio outlet," is the lure with which the hook is now baited. It is an indication that if you haven't yet installed a radio you will soon do so. Eventually, why not now? say the numerous radio outfits.

Still in Its Infancy

Some new aspect of the wonder and value of radio is presented daily. Its future looms so vast, so mysterious, so all-enveloping, that imagination is staggered and we almost shrink from what the morrow may bring forth. The prediction that when radio is perfected we shall be able to hear the voices of those long since dead, has not been considered too fantastic to be widely repeated.

It is hoped that radio may eventually prove the solvent of discord between nations and, through the establishment of one universal language, put an end to international disputes. The vision of radio, guarding locked in its Pandora box the secret of eternal youth, thrills and tantalizes the dreamer. Even now, it can make the deaf hear, as recorded in many cases.

Radio guides the fog-bound ship at sea and the flyer over the misty land. It brings to the family of farmer and fruit grower, the concert and lecture formerly heard only by those in distant cities. It crowds into the sportsman's duffle bag along with his ax and matches. Scarce a field of human endeavor can be found which this airy giant has not invaded. It crops up in religion, in art, in music, in politics, in education, in agriculture, in commerce and business, in crowds and in most lonely places. Who shall set a limit? Who can predict the extreme confines of its expansion?

Loneliness Is Banished

Isolation loses its terrors. Arctic explorers install radio on their ice-fast ship confident of its power to solace the long, lonely night of far northern latitudes. Miners, shut in the gloom of subterranean darkness, hearing the voice from above, seem to inhale a breath of fresher air. The invalid, whose alert mind so rebels against forced inaction that he feels as if buried alive, derives a new and lively happiness from the radio installed at his bedside.

Thus sunshine creeps in wherever the magical voice of the twentieth century is heard. It is related by the faithful that since the mountain would not come to Mahomet, Mahomet had to go to the mountain. The sociable radio assumes no such aloof attitude toward us as did the mountain to the prophet. It brings not a mere mountain, but the whole world to our listening ears.

As straws show which way the wind blows, so small details reveal the in-

timid hold radio is gaining on our daily lives. An acquaintance says that when she signifies her intention of calling on old friends, the answer is: "Come any time except between such and such hours. We're always busy with our radio then." Visitors must wait upon the convenience of the voice.

Churches draw on its aid in spreading the doctrine. Splendid missionary service can be rendered by this swift, untiring, omnipresent messenger. Sermons are widely broadcasted. No longer need the old, the invalid and the remote be deprived of church services. In thousands of country homes, radios are tuned-in every Sunday at the hour when some popular preacher delivers his address.

The educational facilities radio provides for farmers and rural communities, are obvious. Advantages formerly enjoyed by the few, are within reach of the many. The tones of the great teacher are as clear to the far-away listener as to the student seated in the front row of the classroom.

Just Starved for Music

A phrase frequently heard in the country is, "just starved for music." Music is the best loved expression of the radio. In many a lonely farm house where the occupants were formerly starved for music, a rich feast is now provided by the radio set. It is the latest means by which science is drawing isolated communities into the circle of satisfying contacts.

What writer of romance has conceived a more captivating plot than the true story of John Carson, Georgia mountaineer and musician? The fame of the boy, fiddling from early childhood, would still be confined to the tiny length of his own little Main Street, had not the notes of his violin been borne by station WSB, Atlanta, Ga., to the discriminating ear of the manager of a New York company. The manager knew a good thing when he heard it. He induced John Carson to come to New York, thus changing the whole course of his life.

America Leads the World

America stands easily first in the use of radio. Ninety-five per cent of the broadcasting stations of the world are in the United States. Between 4,000,000 and 5,000,000 sets are said to be in use by us. These figures serve as basis for the estimate that in this country alone 20,000,000 persons are listening-in nightly. The movies should look out—more and more people enjoy sitting at home in the evening to be entertained by their radios.

Further evidence of the extreme activity to which the radio bug has excited the fans may be gained from a glance at that particular counter in the ten-cent stores where small radio requisites are sold. Look at the mass of men packed about it. Yes, MEN, the scoffers. They who abhor bargain counters and deride their women folk for submitting to the crush of a special sale.

Not So Fast, Please

Some, who are toiling with might and main to perfect apparatus that shall register the smallest sound, are disposed to think that, as Abe Potash says, "too much is enough." Just as these experts are priding themselves on success in broadcasting the beats of a human heart, there comes the demand that the heart beats of a canary shall be made audible.

Yet that too may be accomplished in time. It is safe neither to predict nor to contradict the predictions of others. Henry Ford's objection to employing highly educated young men was that they came to him "knowing too many things that couldn't be done." That discourages experiment. In the bright lexicon of radio, there is no such word as "impossible." Knowing this, we do think we may venture on just one prediction: If you have no radio, you are going to get one before long.

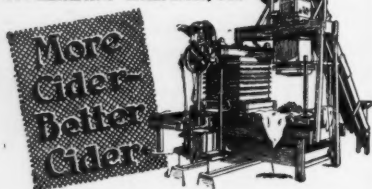
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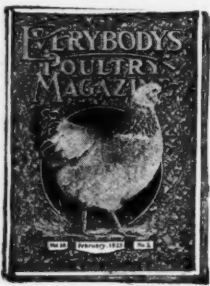
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Classified Advertising

(From Page 25.)

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COMPETENT FRUIT MAN WISHES CONNECTION with party establishing large orchard. Box 43, Bantam, Conn.

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PURE HONEY—5 LBS. LIGHT CLOVER. POSTPAID, 3rd zone, \$1.05. 95c. Retail and wholesale quotations on honey packed in glass, pails and cans, free. Roscoe F. Wixson, Dept. 6, Dundee, New York.

Loganberries in Puget Sound Country

(Continued from page 20.)

ture, and under such conditions will yield four to five tons per acre. Yields as high as six tons are reported.

Of all non-alcoholic drinks, loganberry juice is the most seductive, in the opinion of fruit-juice connoisseurs. In jellies and jams, also, the loganberry has won great popularity throughout the United States.

In 1921 the berry growers of the Puyallup valley and the southern part of the Puget Sound country organized a co-operative selling organization, the Washington Berry Growers' Ass'n, with headquarters at Sumner, Wash., in the Puyallup valley. A second organization with the same membership was formed to take over the Baker cannery at Sumner, which is known as the Washington Berry Growers' Packing Corp. Other fruits besides loganberries are handled. So efficiently was the business conducted last year that the loganberry growers received six and one-half cents per pound when the local market was paying but three or four cents. Such berries as were too ripe for the fresh fruit market were either canned, or put up in barrels—a layer of berries alternating with a layer of sugar, one pound of sugar to two pound of berries—and these barrels sold to jam manufacturers throughout the country. Also, when the fresh fruit market became overstocked the surplus was thus disposed of, preventing all waste. The barrels, when filled, must be placed in cold storage within eight hours to prevent fermentation. Soft drink establishments also use the barreled berries as flavoring for soda fountain drinks.

Most of the profit made last year by the members of the Washington Berry Growers' Ass'n was made on the canned and barreled berries.

E. C. Orton is president of the Washington Berry Growers' Ass'n and J. A. Forehand, secretary-treasurer. C. V. Lockridge is president of the packing corporation and Mr. Forehand secretary-treasurer.

Some New Fruits

NEW VARIETIES of fruit that give promise of being really worth while additions to the list available to the fruit grower are described and illustrated, some of them in color, in a recent bulletin issued by the New York State Agricultural Experiment Station at Geneva. "New or Noteworthy Fruits" is the title of the publication written by Dr. U. P. Hedrick, Station horticulturist. Several new apples, a new pear, new raspberries and other fruits are described. The bulletin is free and may be had upon request to the Station authorities.

The object of the fruit testing work at Geneva is described by Dr. Hedrick as being an attempt on the part of the Station to do for the fruit growers of the state what the individual grower cannot do for himself. This is to test every variety of fruit that will grow under New York conditions to discover any worthy sorts that might profitably be grown on New York farms. The Station fruit men are also constantly striving to secure better sorts by crossing different varieties. As a result of this breeding work, many new and valuable varieties have been developed in recent years, some of which are described in the new bulletin.

Ford Runs 57 Miles on Gallon of Gasoline.

A new automatic and self-regulating device has been invented by John A. Stransky, 2829 Fourth St., Pukwana, South Dakota, with which automobiles have made from 40 to 57 miles on a gallon of gasoline. It removes all carbon and prevents spark plug trouble and overheating. It can be installed by anyone in five minutes. Mr. Stransky wants agents and is willing to send a sample at his own risk. Write him today.—Adv.

CHATS WITH FRUIT GROWER'S WIFE

By HAZEL BURSELL



Antidotes for Poisons

SUPPOSE your son Johnny got hold of a bottle of carbolic acid or other poison and drank some of it. Would you know what to do and how to do it? Your knowledge, or lack of it, would probably mean life or death to your boy, as, in most cases, it would be too late by the time the doctor made the trip into the country. Your hope of success lies in knowing the proper treatment for that specific poison and in giving it promptly. Would you be master of the situation, or would you throw up your hands in utter helplessness?

If you have the knowledge you will be master, and it is with the hope of giving this information, shorn of too technical names and phrases, that this article is written. Should you have no such emergency to meet in your own family, possibly you may be able to perform a great service for a neighboring family.

In any case of poisoning, send for the doctor at once. Then proceed with first aid measures.

Determine Source First

The first and most important step in the treatment is to determine the exact source of the poison, as each one has a special treatment which has been found most effective for that particular substance. In other words, you will have to recognize symptoms unless the patient was seen drinking out of a labeled bottle or eating certain things. Important symptoms will be listed together with treatments in this article. There are three classes of poisons: (1) Corrosives, or those which "eat into" or burn tissue; (2) Irritants, which irritate tissue; (3) Neurotics, which affect the nervous system. The treatment varies with each.

To give relief from poisons, you must accomplish three things—remove the injurious substance from the system, neutralize its further action and remedy the ill effects already produced. The first object is attained by giving a stomach wash (called "lavage") or an emetic (causing the patient to vomit). The giving of a lavage is often best left for the physician if he can arrive within a short time, while other methods are employed as first aid measures. Lavage is preferable to emetics, as the latter causes marked weakness in the patient. Emetics are never given after poisoning by corrosive chemicals, as the throat will have been burned from the poison.

The common emetics are: (a) Table Salt solution, two teaspoonfuls in a glass of water, repeating the dose several times if necessary; (b) Mustard, one or two teaspoonfuls in a glass of water; (c) Tickling the back of the throat with the finger. The proportions given for salt and mustard solutions are for adult doses and children's would be somewhat weaker solutions.

Method for Lavage

For an emergency lavage or stomach wash, you will need a piece of rubber tubing (lacking any other, the tube on a fountain syringe bag will do), a funnel, a towel, a piece of gauze or soft cloth for the patient, a pail in which to catch the siphonage, with paper or rubber under it, and two pitchers of water, one at a temperature of 105 degrees Fahrenheit and the other with water at 115 degrees Fahrenheit.

Place the towel around the patient's neck, and if he or she has false teeth remove them. Place the pail on the floor with the rubber or paper under

it, in a position to receive the siphonage. Expel the air from the tube by pressing it, keeping the funnel mouth downward on the tray or bed. Insert the tube gently, keeping it curved to follow the curve of the throat. Do not use force as the stomach wall may be injured. Hold the funnel end of the tube not more than three or four inches above patient's mouth and fill the funnel with water. Allow the water to run slowly through the tube until the funnel is almost empty, then refill it. Never allow the funnel to become quite empty as air will be introduced into the stomach and this will both cause pain and interfere with siphonage. When about one pint has entered the stomach, lower the funnel into the pail and the liquid will siphon back. Repeat this procedure as often as is necessary. Pinch the tube when removing it, otherwise water may trickle out and get into the wind-pipe. This, then, is the method of giving a lavage, but other treatments should be tried first by the novice if the doctor can reach the patient quickly.

Antidotes Are Given

The second object in the treatment will be accomplished by giving a chemical antidote, a substance which will, by acting upon the poison in the system, produce a compound which is either insoluble or comparatively harmless. Mild acids are always given for this purpose when alkali poisons, such as ammonia, have been taken, and alkalies are given when the poisoning agent is an acid, for acids and alkalies combine to form what is usually a harmless salt. Tannin, given in the form of strong tea, will precipitate nearly all alkaloids, such as antimony and digitalis. This precipitate may be dissolved again, so a lavage must be given after this treatment.

The third type of treatment aims to counteract the effect of the poison on the system and consists of physical things, as certain things to drink, rest and quiet, application of heat or cold, etc.

Corrosive Acids

Acetic, Citric, Nitric, Sulphuric—Symptoms: Corrosion of membrane of throat, intense abdominal pain, livid cold skin, small, irregular pulse, stupor, collapse and sometimes convulsions. **Antidote:** Baking soda, magnesia, chalk or lime water. **Physical Treatment:** Oil or milk to drink, albumin (as egg white), stimulants and external heat.

Oxalic Acid—Symptoms: Same as above. **Antidote:** Chalk or lime water, but no soda or potash as their salts with oxalic acid are poisonous. **Physical Treatment:** Same as above.

Carbolic Acid—Symptoms: Same as above. Also odor of carbolic acid in breath, vomitus or urine. Smoky urine. Sometimes retention of urine. **Antidote:** Sulphate of magnesia, sulphate of soda, lime-water, syrup of lime. **Physical Treatment:** Same as above, but give no oil, as oil hastens absorption into the system. It may be necessary for the physician to catheterize to remove the urine, but this should never be attempted by the unskilled person. Try letting water run or drip where the patient can hear it, as this often relieves the patient in case of retention of urine.

Corrosive Alkalies

Ammonia, Caustic Potash or Soda, Potassium Nitrate, Calcium—Symptoms: Burning of tissues, violent abdominal pain, vomiting and purging of bloody matter, collapse. **Antidote:**

Mild acids, as vinegar, lemon juice, sour cider. **Physical Treatment:** Heat, stimulants, milk, oil, white of eggs for ammonia. Cold air, artificial respiration if needed.

Irritants

Antimony — Symptoms: Abdominal pain, shrunken features, cramps in lower extremities, convulsive spasms, collapse. **Antidote:** Tannic acid, in the form of strong tea. **Physical Treatment:** Demulcent drinks, as milk and oil, heat.

Arsenic — Symptoms: Puffiness and itching about eyelids, intense abdominal pain, violent vomiting, hiccup, intense thirst, straining, stools bloody and offensive, collapse and sometimes convulsions. **Antidote:** Iron. Common preparations of iron used for this purpose are: (1) Tersulphate of iron in a strength of one part iron to four of water. Mix two ounces of this with eight of one per cent solution of magnesium carbonate. Let it remain in the stomach 15 minutes, then wash out the stomach. Repeat two or three times. (2) Tincture of iron hydrated with sufficient ammonia to deposit the iron in a thick sediment, the sediment then to be washed by putting in a fine strainer lined with gauze and pouring water over it. Mix a tablespoon of the precipitate with milk or water. Repeat the dose at intervals. Eight grains of iron are required to neutralize one grain of arsenic. **Physical Treatment:** Demulcent drinks, as milk or oil, heat, stimulants if necessary. Arsenic poisoning is largely a problem for a physician.

Bichloride of Mercury, Calomel — Symptoms: Salivation, metallic taste, throat membrane sometimes glazed and white, vomiting of blood and mucus, dysenteric purgings, diminishing urine. Collapse after a short time and convulsions. **Antidote:** White of egg in water. One egg to every four grains of iodoquin. **Physical Treatment:** Copious mucilaginous drinks, heat, stimulants if necessary, milk and flour paste.

Iodine — Symptoms: Yellow stain about mouth, pain and burning of alimentary canal, vomiting, purging. **Antidote:** A paste of starch or flour and water. **Physical Treatment:** Same as for Bichloride of Mercury.

Lead — Symptoms: Slate-colored lines on the gums along margin of incisor teeth, colic, and other symptoms of irritant poisons, paralysis of certain muscles of the forearms. **Antidote:** Sulphate of sodium or magnesium, the white of eggs and milk. **Physical Treatment:** Same as for Bichloride of Mercury.

Neurotics

Aconite — Symptoms: Characteristic tingling, pulse irregular, intermittent and slow; respirations shallow, weak, sighing and slow; anxious expression, eyes glaring, dilated and protruding. The mind is usually clear, but there are often convulsions (Acute Poisoning). **Physical Treatment:** Atropine, or digitalis, heat, keep head low, artificial respiration. Case for doctor.

Digitalis — Symptoms: Pulse irregular, slow, weak and out of proportion

to the heartbeat; headache, face pale, eyes staring and prominent. Vomiting, great prostration, rapid respiration, convulsions. **Antidote:** Tannin in the form of strong tea. **Physical Treatment:** Strychnine, to be administered only by doctor. Keep patient quiet and in horizontal position.

Potomaine Poisoning

Potomaine poisoning is caused by eating putrefying foods—foods in which the substances have broken down to form poisonous compounds. **Symptoms:** A few hours after eating the poisonous food, there will be nausea; abdominal pain and usually purging; followed by faintness, weak pulse, cold moist skin, thirst, and in some individuals, a bright red rash. **Treatment:** An emetic, such as suggested earlier in the article, or lavage as described, heat especially to the abdomen, stimulants if necessary, and later a large dose of castor oil.

Mushroom Poisoning

Symptoms: Nausea, vomiting, colic, diarrhea, weak pulse, labored breathing, cold moist skin. The pupils of the eyes are at first contracted but later become dilated. These symptoms, unless relieved, are followed by collapse and at times by paralysis. **Treatment:** Empty the stomach by lavage or emetic, apply heat, apply hot packs to the abdomen, stimulants. Atropine is often used, under doctor's orders. Later give a large dose of castor oil.

Insect and Snake Bites

The poison of the majority of insects, such as bees, spiders, etc., consists largely of formic acid; therefore, to relieve the irritation following a sting, use an alkali, such as ammonia water or a saturated solution of soda. In case of a snake bite, if the wound is in one of the limbs, apply a tight bandage above the point of injury to shut off the return flow of blood. Leave the bandage on for about one-half hour and then loosen slowly—the effects of the poison are not so severe when it enters the system slowly. Unless bleeding is caused, induce it by making a slight incision with a sterile or clean instrument, and apply a cupping glass, or suck on the wound, being careful to spit out the poison. Cauterize the wound with silver nitrate or, lacking this, the heated point of a knife or other instrument. Alcohol is of no value in treating snake bite.

As in all other things, "An ounce of prevention is worth a pound of cure!" Keep all poison chemicals plainly marked with poison labels, and separate from all other medicines. Keep them either under lock and key or entirely out of reach of children, and always put any bottle that has been taken down back in its place at once. Never take medicine in the dark, and always read the label twice or three times before taking. Poisoning from careless placing of bottles is inexcusable. Then begin when the children are very young to instill in them a wholesome fear of all poisons. Teach them to recognize and avoid poisonous plants and berries.

Tempting Berry Desserts

Strawberry Ice Cream.

1 pt. milk 1 c. sugar
1/2 pt. cream 1 pt. strawberries
Crush the washed and hulled strawberries, add sugar and allow to stand 15 or 20 minutes. Strain and use only the juice and pulp which passes through strainer. Combine all ingredients and freeze.

Loganberry Sherbet.

2 c. water 1 1/2 c. loganberry juice
1/4 c. sugar (more if desired) 2 T. lemon juice
1 1/2 c. orange juice
Mix fruit juices, water and sugar; strain, freeze and serve in trolley glasses.

Rich Strawberry Short Cake.

2 c. flour 1/4 c. butter
4 t. baking powder 1 1/4 T. lard
1/2 c. sugar 1/2 c. milk
1/2 t. salt Few grains nutmeg

Mix dry ingredients and sift twice; work in shortening and add well beaten egg and milk. Roll on floured board, put in baking pan, shaping with hand to fit pan or cutting with biscuit cutter into fancy shapes for individual servings. Bake in hot oven 12 minutes. Split open and spread under layer with butter. Then spread with crushed berries which have been allowed to stand 15 minutes with sugar for sweetening. Heap berries on top.

Plain Strawberry Short Cake.

2 c. flour 1/4 t. salt
3 t. baking powder 1 T. sugar
5 T. butter

Sift flour, baking powder and salt together. Add sugar. Cut in butter and add just enough milk to make a soft dough, about 1/4 c. is needed. Dough should be as soft as can be handled without sticking. Roll into round layers, rather thin, and spread under layer lightly with butter. Put layers together and bake in hot oven. When cool, split the layers, spread under layer with butter and add sweetened, crushed berries. Heap the top with berries and serve with cream. Raspberries, blackcaps, dewberries or wild blackberries make equally good fillings.

Rice Mold With Fruit.

Soak 1/2 envelope gelatin in 1/4 c. cold water 10 minutes and dissolve by standing cup in hot water. Add 1/2 c. of any canned or fresh fruit juices at hand (cherry, pineapple, raspberry, strawberry, loganberry are all good), 1/2 c. sugar and few grains of salt to 1 c. cooked rice. Strain into this the dissolved gelatin and mix thoroughly. Cool slightly and add 1 cup of whipped cream or milk. Turn into mold, which may be decorated with slices of pineapple or other fruits. Serve with or without cream.



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Beech-Nut Prepared Spaghetti

with delicious cheese and tomato sauce



The Switchboard Comes to Life

Zero hour approaches. Wire chief and assistants are set for the "cut-over" that will bring a new central office into being.

In the room above operators sit at the new switchboard. Two years this equipment has been building. It embodies the developments of hundreds of engineers and incorporates the scientific research of several decades. Now it is ready, tested in its parts but unused as an implement of service.

In the terminal room men stand in line before frames of myriad wires, the connections broken by tiny insulators. Midnight comes. A handkerchief is waved. The insulators are ripped from the frames. In a second the new switchboard becomes a thing alive. Without their knowledge thousands of subscribers are transferred from the old switchboard to the new. Even a chance conversation begun through the old board is continued without interruption through the new. The new exchange provides for further growth.

This cut-over of a switchboard is but one example, one of many engineering achievements that have made possible a wider and prompter use of the telephone.

To-day, in maintaining a national telephone service, the American Telephone and Telegraph Company, through its engineering and research departments, continuously makes available for its Associated Companies improvements in apparatus and in methods of operation.



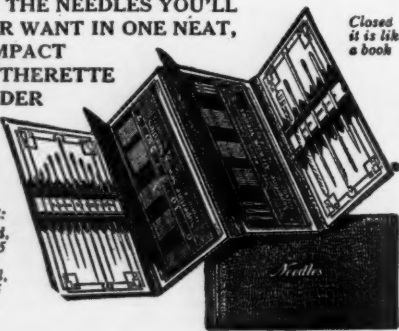
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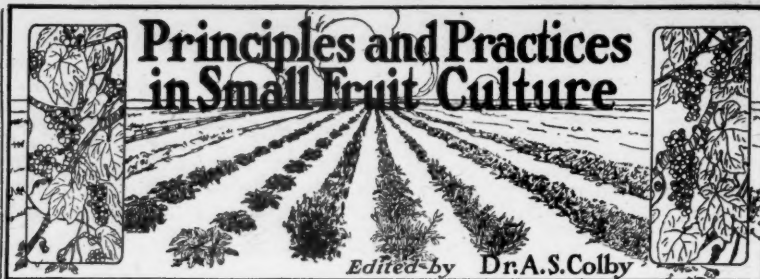
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American Fruit Grower Magazine
53 W. Jackson Blvd. CHICAGO



Hardy Ornamental Shrubs With Edible Fruits

IT IS not generally recognized that an ornamental shrub, which fills a distinct place in the art of landscape gardening and the beautifying of homes and gardens, may in many cases also serve a utilitarian purpose. There are many shrubs grown primarily for their flowers which also bear fruit of good quality, fruit which may be used to advantage in the making of jellies, preserves and marmalades. It certainly is worth while to include some of these doubly useful plants in arranging the plantings about the home, since they may be used in foundation planting, in borders, as hedges and in helping to screen out undesirable views.

Few nurserymen make any effort to acquaint the buyer with the fact that certain species and varieties of flowering quince, for example, bear fruit of good size, suitable for the making of quince honey; that the dwarf Juneberry bears fruit of excellent quality; that some of the mulberries are too good for chicken feed only.

The writer has been interested in the subject for several years and has made a beginning in the collection of plants primarily of ornamental value, which can also be of considerable use in furnishing new sources of food. Others have also been interested, especially Hansen of South Dakota, Darrow of the United States Department of Agriculture and Hedrick of the New York Agricultural Experiment Station at Geneva. Hansen has been primarily interested in bringing plants from northern Europe and Asia which would stand the severe climate of the Dakotas and has, through a process of breeding and selection, brought out a number of valuable small fruit plants, including bush plums, cherries, gooseberries and roses with edible seed pods. Darrow has worked, among other things, with the American High Bush Cranberry, *Viburnum Americanum*, and in reporting the results of his work in the "Transactions of the American Society for Horticultural Science," for 1923, says that "the hardness of this fruit, its pectin content and the color of the jelly made from it combine to make selected strains of it of considerable promise as a jelly fruit in northern regions with severe winters." Hedrick in his "Cyclopedia of Hardy Fruits" reports on the promising behavior of certain elderberries as well as high bush cranberries growing on the grounds of the New York (Geneva) Station.

Two years ago, the writer had the good fortune to study the Japanese quinces growing in the Arnold Arboretum near Boston. The various species and varieties of *Chaenomeles japonica* and *Ch. Maulei* were found to bear fruit of very different character as to size, shape and culinary quality. This study is being continued through the courtesy of the Arboretum. There are few more beautiful ornamental shrubs when in bloom than the Japanese quinces and the fact that some of them bear fruit of edible quality makes these shrubs doubly valuable.

The Chinese quince, according to Hicks Nursery of Long Island, bears fruits of excellent quality for preserves. The plants I have under observation have not as yet borne any fruit, neither have I been successful in securing fruit from *Lonicera caerulea villosa* in Illinois. This dwarf bush

honeysuckle was bearing fruit of good quality at the Arnold Arboretum in 1922. It appears promising as a dwarf bush in the foreground of the shrubbery border.

Most people, especially in the middle west, are familiar with the shad bush or Service berry, *Amelanchier alnifolia*. It is also known as the Juneberry. The dwarf form, especially, forms symmetrical bushes which bear large crops of bluish black berries in June quite similar in taste to huckleberries and excellent either for eating out of hand or in pies. There are, of course, great differences in size and flavor of the berries from different bushes and by securing propagating wood from superior plants, it has been possible to produce a fruit of good size and excellent quality.

Mulberries have not been commonly regarded as promising material by the plant breeder or the housewife. Most of the varieties are grown either for ornament or planted in the chicken yard for the chickens and with the vain hope that the robins will leave the berries alone. There are, however, varieties which bear fruit somewhat more tart than others and which can be used to advantage in combination with gooseberries for pies and in preserves. Many of the red mulberry varieties if picked a shade underripe and canned like raspberries will taste very much like loganberries if served with meat at the winter dinner table. I have tried them and I know them to be excellent.

The gumi, *Elaeagnus multiflora*, is another ornamental shrub, the fruit of which is comparatively unknown. The shrub itself is of medium size with bright silvery green leaves and inconspicuous yellowish-white blossoms. The orange-red fruit, ripening in July, is well liked by the birds. If they can be prevented from clearing up the whole crop, which they will do in a very short time if unmolested, the fruit should be gathered when ripe and made into a jelly or jam similar to that from currants or gooseberries. The fruit is not juicy and therefore a good sized panful is necessary to make up a small batch of jelly. The jelly has a peculiar flavor and goes well as a relish with such meats as lamb.

These are only a few of the so-called ornamentals which can easily be made to serve a double purpose. We are also working with others of equal promise.

One of the most interesting things about the work is the possibility of finding in the woods or along the river bank, for example, a specimen bush of elderberry or Juneberry, or some other native shrub, bearing larger fruit of better quality than its fellows. Easily propagated, we soon have a superior variety perhaps, available in such numbers that many people can avail themselves of the woody flavor and unusual tang of jam and jelly made from such fruit. Practically all the advance made in improvement of this group of plants has been through selection of superior individuals from the wild. In this work we can all have a hand. Let us keep in mind, for example, the need for a larger elderberry with fewer seeds, a mulberry not so sweet and insipid, a more juicy Juneberry. It may be if we all look we shall get quicker results than by the slower though perhaps more sure methods of plant breeding.

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(See Page 22 for other Classified Ads.)

BETTER HOME DEPARTMENT

Electric Motor, the Farmer's New Hired Hand

by E. W. Lehmann

THE ELECTRIC motor is playing a big part in relieving the labor situation on many orchards and farms where there are a lot of chores to be done about the home and the property. A survey in Bureau County, Ill., made by the Department of Farm Mechanics of the University of Illinois, disclosed the fact that over 500 agriculturists in that county are users of electricity from power lines. A food producer who once uses electric power can hardly get along without it thereafter.

There is no question but that there are many orchardists and farmers who are up against a difficult problem at the present time due to the shortage of farm labor. With the present low prices he receives for his products, the farmer cannot compete for labor against the contractor or the manufacturer who pays more money and works his men shorter hours. Under these conditions, the farmer must resort to more machines wherever it is possible. Wherever a machine can be used on the farm instead of a man, the operating costs are reduced. It costs 10 to 20 times as much to pump water by hand as to pump it with an electric motor, yet many farmers let the hired man or some member of the family do the pumping.

There are many jobs about the farm home where the electric motor can take the place of a hired man. The cost of operating a one-fourth horsepower motor is only one or two cents an hour, and such a motor will pump water faster and turn the cream separator more uniformly than any man. It will also take the place of the boy in turning the grindstone and on washday will make it possible to get the clothes on the line in half the time when a hand power machine is used.

The manufacturer has found that the individual motor for each job is better than group drive, where one large motor drives a line shaft from which several machines are driven. The same idea has also been adopted in many fruit packing houses in which more than one grading machine is operated. A motor for each machine is also better for the fruit grower and farmer, because a motor selected to drive a particular machine would be operating at more nearly full load and therefore would be more efficient than a larger motor operating at only a fraction of its full load, due to the fact that all of the machines belted to the line shaft would not be operating at the same time.

Where there are several machines, such as a cream separator, a washing machine, a mangle, a shallow well pump, a small corn sheller, or a small grist mill that requires about the same power for driving, then one portable motor mounted on a stand that can be taken from one machine to another makes a satisfactory unit, and the cost is cut down to a minimum. Often two or three portable motors of different sizes are desirable to have about the place to take care of different machines of different capacities.

There are many reasons why the electric motor is valuable to fruit growers and farmers as a power unit. Motors can be secured in all sizes. A size is built to drive the sewing machine and bread mixer, there is also

a size to drive the silage cutter and the threshing machine. The first cost of small motors that have sufficient power to do most of the work about the home is very low; for the larger units the cost is no more than the cost of other kinds of power units. The wear and tear on electric motors is very little and the cost of upkeep and operating expense is not a big item.

One of the big advantages of the electric motor from the standpoint of the farmer is the fact that it can be made practically automatic in its operation, also it can be controlled from a distance. A motor can be started or stopped in the barn by a switch either at the house or at the barn. By a special control switch, a motor can be stopped when a certain amount of water has been pumped or when a certain amount of feed has been ground. The fact that a motor can be started by closing a switch makes it possible for a woman or a child to operate it without effort.

The electric motor is no doubt the most reliable type of power now available. It will operate weeks and months with little or no attention. Motors should not be neglected, however, but should be cleaned and oiled at regular intervals. Lubrication is important in the life and the operating efficiency of any machine.

The fact that an electric motor will stand a big overload makes it a good type of power for the farm. The load varies greatly on many of the farm machines; one instant the motor is operating under a light load and the next it is greatly overloaded. This is true of a washing machine and is also true of the silage cutter. The electric motor can operate with 50 to 100 per cent overload without damage.

Where electric power is now available at a reasonable rate, no farmer can afford to be without one or more electric motors. The first cost of making the power available may appear large, but if a reasonable need of power exists, no mistake will be made in making this power available. Not only will there be a saving in labor in many operations about the barn but there will also be many savings in the home. Make electric power available and it will more than repay you in many ways.

As a farm hand the electric motor is reliable; "he" will always start work at instant notice, and do more than "his" share without complaining. "He" works during cold weather as uncomplainingly as when the weather is hot, and the more hours "he" works, the less pay "he" demands. The electric motor is an unusual "hired hand."

When writing advertisers mention the American Fruit Grower Magazine.

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When did you find your ideal tobacco?

Sooner or later we all choose the perfect smoke partner—

Here is an interesting letter from Mr. Charles H. Bishop of Chicago. It confirms the truth of an old proverb—"better late than never."

We hope that reading it may show some misguided pipe smoker the path to smoke satisfaction.

Chicago, Ill.

Larus & Bro. Co.,
Richmond, Va.
Gentlemen:

I am glad to write you that I have convinced a man of fifty years' smoking experience that "it's never too late to change." The new convert to Edgeworth is my father-in-law, now approaching seventy. Year after year at Christmas I had bought him, among other things, a large jar of tobacco; but until this year my heart was never wholly in the selection.

But this Christmas I purchased Edgeworth, which he had tried after constant urging on my part—and he's satisfied!

Yours sincerely,
Charles H. Bishop.

We are glad Mr. Bishop induced his father-in-law to try Edgeworth, and we hope that the old gentleman will derive much pleasure and comfort from his pipe for many years to come.

But it seems to us a shame that he didn't become acquainted with Edgeworth many years ago.

A man misses a lot of solid comfort in life until he "hooks up" with the tobacco that is friendly to his palate—the "old reliable" to which he invariably returns whenever he ventures forth into other fields.

We try to make Edgeworth a tobacco that most men will like regardless of age, and the evidence would seem to show that we do.

Of course, we don't hope to suit every man's taste, but a great many smokers have found Edgeworth "just right."

Why not let us send you a free sample of Edgeworth? Maybe it's just the smoke you've been looking for.

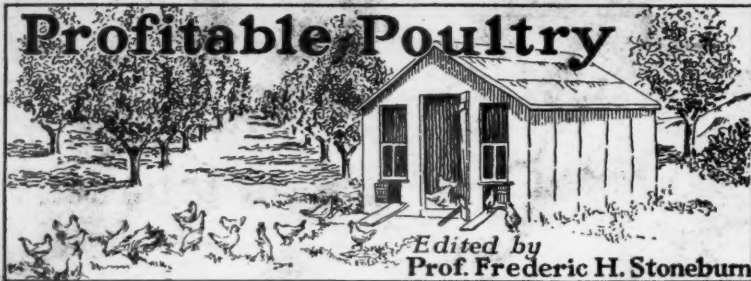
Edgeworth is sold in various sizes to suit the needs and means of all purchasers. Both Edgeworth Plug Slice and Ready-Rubbed are packed in small, pocket-size packages, in handsome humidor holding a pound, and also in several handy in-between sizes.

Your name and address on a postal to Larus & Brother Company, 83 South 21st Street, Richmond, Va., will bring you generous samples of Edgeworth with our compliments.

If you care to include your dealer's name and whereabouts we will appreciate the courtesy.

To Retail Tobacco Merchants: If your jobber cannot supply you with Edgeworth, Larus & Brother Company will gladly send you prepaid by parcel post a one- or two-dozen carton of any size of Edgeworth Plug Slice or Ready-Rubbed for the same price you would pay the jobber.





Disposing of Surplus Cockerels

SPECIAL attention is given to the growing and fattening of table poultry in many foreign lands, notably France, Belgium and England, yet in America we have relatively few poultrymen who make a specialty of this. While Americans eat tremendous quantities of chickens—broilers, fryers, roasters and stewers—practically all of these birds are a sort of by-product of the laying flocks. Included are the cockerels from each season's crop of chickens, the inferior pullets, the worn-out breeding birds and the layers which are no longer profitable producers.

Most of these are sold by the growers in the condition in which they come from the range or laying pens except, possibly, a brief period of feeding on corn. Many are purchased by the big commercial fattening establishments and converted into prime table stock, but too large a proportion goes to the consumer in rather poor condition.

During recent years we have largely concentrated on the production of table eggs. We have bred for eggs, fed for eggs. And the average production of the American Hen has been greatly increased. The 200-egg hen is very common, the 300-egg hen is not rare. But we have, to a very great extent, overlooked the table poultry end of the business, and there now seems to be good opportunities for specialists in this field.

The better markets want more prime table stuff, birds of suitable breeds, properly fattened and nicely dressed. For such they will pay handsomely and the producer will not be compelled to meet stiff competition. For instance, in late April heavy capons were selling readily on the New York market at 75 cents per pound **LIVE WEIGHT**. Certain shippers who sent in large consignments of capons received more than \$6 per bird, net. Which shows that the market does appreciate quality and will pay for it.

This has a bearing upon one of the big problems confronting everyone who grows many chickens—the profitable disposal of the surplus cockerels which make up about one-half of every flock. Too frequently these are sold in the easiest way, merely to get them off the place and without much consideration of market possibilities. Or they are held until they pass the age of profitable growth and then carried for a considerable time at a loss of labor and feed. In either case, the producer loses some money which he might obtain if he would only study the game.

Generally speaking, the early cockerels hatched in February, March and, possibly, early April, sell to advantage as broilers. Such reach broiler weight when the market is relatively free from fresh-killed poultry and before the great flood of hen-hatched chicks begins to flow in from the general farms. Those who breed Leghorns will usually find it advisable to sell the cockerels as broilers when they reach the required weight and regardless of the quotations. Such chickens do not sell to advantage on the open market when they reach full maturity, so it is seldom advisable to hold them beyond the broiler stage, excepting such as will be required for home use.

Late hatched cockerels of the heavier breeds, the May and June stuff, present the real problem. Each grower should carefully consider his local conditions and be guided accordingly.

First of all, a liberal estimate should be made of the number which the fam-

ily can use to advantage through the fall and winter, and that number set aside. These home-grown chickens are produced at a lower price per pound than the butcher charges for meats which are inferior. Save money by eating your own chickens instead of buying meat.

The salable surplus may be handled in one of three ways. If the broiler market—usually low at this time of year—happens to be sufficiently high to insure a reasonable profit on the birds, turn them off as broilers. Take the profit, reduce the feed and labor bills, avoid the danger of loss from disease, accidents and chicken thieves.

If broiler quotations are so low that production costs will not be secured, hold the birds until they reach roaster weight, or caponize them. As roasters, they should be sold as soon as they reach top form, have made full weight but have not begun to harden and go back. Capons should be held for sale during the winter holidays and early spring.

Big capons are much wanted just before Easter and the top prices of the year are frequently received at that time. Those who have an abundance of feed, especially corn, will frequently find it profitable to carry their choice capons through the winter and so secure the benefits of large size plus high price.

Returning to the birds which are intended for home use. These should be caponized at the proper age or else canned when they reach good weight and are in prime condition.

Capon have many advantages over cockerels after the latter reach a certain age. During the late fall and winter months, the cockerels eat heartily but do not gain much in weight. They actually lose in value as the months go by, since they become hard-fleshed and "staggy." If left with the general flock, they are a constant nuisance. If penned by themselves, they are continually fighting and cause endless trouble and annoyance.

The capons are easily handled, remain soft and tender indefinitely and continue to increase in size all winter. Those who wish a supply of fresh-killed chickens can keep a flock available, "on the hoof," until broilers are ready next spring, by merely caponizing the required number of cockerels. These birds will steadily increase in value and so pay for their keep.

Those who do not have a suitable building available or do not wish to feed and care for an extra bunch of live birds, yet want plenty of material available from which to make chicken dinners, will do well to can the surplus cockerels when these are well grown and still remain in good condition. Boiled or fried and safely packed in cans, they will neither fight nor eat, will not die or be lifted from the roosts, will occupy no valuable space in the poultry building, will not demand daily care, yet they will be ready for use at a moment's notice whenever wanted. It's a heap easier to take down a can of chicken when needed than to go to the work of killing and dressing a bird or two.

Modern methods of canning, by the use of the steam pressure cooker or the water bath canner, are so well known to capable housewives that the poultry editor is not justified in attempting to present the details. In the field of domestic science I can only qualify as a food tester, and I am prepared to testify that home-canned chicken is most excellent eating.

Give Bees Better Care and Secure Bigger Crops

by H. F. Wilson

BEESKEEPERS who are interested in securing a maximum crop of honey should begin planning their 1925 work in July, 1924. Strong colonies of bees at the beginning of the honey flow mean a maximum crop of honey. In order to insure strong colonies in the spring, it is necessary that certain preparations for the season be made the fall before.

Requeen at Least Every Other Year

Every colony of bees should be requeened at least every two years, and some beekeepers are of the opinion that it should be every year, as queens older than two years do not ordinarily have sufficient vigor to keep up the colony strength. The proper time to requeen is in July and August, although in cases of emergency it may be done later. There are several reasons why young queens are desirable. It has been frequently noted by many beekeepers that young queens continue to lay longer in the fall than queens that are two or more years old. We know that young bees are necessary for carrying the colony over the winter in first-class condition. We also know that the trouble known as spring dwindling is almost entirely due to the dying off of old bees, and where these predominate, a colony in a short time may be reduced from a very large to a small colony, the bees remaining being those that developed late in the previous fall.

Young queens less than one year old do not have the tendency to swarm that is found with the older queens, and this is quite important in the matter of swarm control.

In sections of the country where we have a fall honey flow, brood rearing will be carried on by the bees without assistance from the beekeeper, but in the north where the honey flow ends about the first of August, it is well to do a little slow feeding in September to stimulate the bees to keep up brood rearing.

Queens for requeening may be bought from a queen breeder, or if the beekeeper desires, he can rear his own queens.

Care of the Honey Crop

The value of the honey secured by any individual beekeeper may be reduced as much as 25 per cent by improper attention to removal of supers and extraction of each individual honey flow. It is well known that the early honey is usually very light in color, while late summer flows may be darker and of poor flavor. If the early flows are left on the hives and dark honeys are permitted to be stored in the same brood chambers, the result will be a darker grade of honey. As the prices of honey are to a large degree based on color as well as flavor, keeping the light honey separate from the dark honey is worth money to every beekeeper.

Another reason why more beekeepers find it difficult to sell their honey is the unsanitary way in which it is put up and placed on the market. There are a great many beekeepers who do not strain their honey well to begin with, and these same beekeepers usually put their honey up in all kinds of jars and under all kinds of labels. Very frequently good sales are lost by specks of dirt and wax left in the honey. When the customer holds the honey up to the light and sees these specks, naturally he comes to the conclusion that the honey is not pure and clean. All glass containers, as well as tin containers, should be thoroughly wiped out before honey is placed in them in order to avoid specks of dust or dirt in the honey. Strain it through two thicknesses of a good grade of cheese cloth. In bottling the honey, be sure that it is not heated to higher than 160 degrees Fahrenheit. Pour the honey into the containers while

it is still hot. This will help to keep it from granulating for a much longer time than if it is canned while cold.

Marketing the Honey Crop

By far the most difficult problem which the beekeeper has to meet today is the marketing of the crop after it has been secured. As a matter of fact, it is no longer difficult to secure good crops of honey, but getting it onto the market at a reasonable price is very difficult except for the most experienced salesmen. It is unfortunate indeed that lack of crops among the farmers has resulted in a depressed market for farm products, while the cost of living essentials has continued to remain at a high level.

In the case of the beekeeper, it is quite apparent that the beekeeping fraternity in general is to blame for low prices of honey. Honey is becoming more popular as a food. This is clearly demonstrated by the larger amounts of honey that are being placed on the market. During the past year, many tons of honey have been used by bakers for baking. It is a well known fact that honey in any kind of bread or cake mixture will help to keep such products moist for a long time. It is expected that this market will continue to grow and lower grades of honey should be thrown into this channel.

For a basis of discussing the price of honey, let us start with the assumption that no beekeeper in the Mississippi Valley or the eastern part of the United States can produce honey for less than 10 cents a pound, that is, the actual cost of production, considering the cost of equipment, interest on the investment and labor in producing the honey and preparing it for market, will total 10 cents, and in some cases, even higher. Unfortunately, very few of our beekeepers consider their time worth anything, and a three or four per cent return on any investment seems to be highly satisfactory.

Just what the price of honey should be to the retailer is a question which only each individual beekeeper can decide upon his cost basis for production, but it is safe to say that extracted honey should retail for not less than 20 cents a pound and comb honey for from 25 to 30 cents a pound. It is very questionable indeed as to whether any beekeeper in the territory mentioned above can produce comb honey and sell it retail for less than 20 cents a pound to make wages.

The remark has often been made that the amount of honey produced in the United States today is so small that a satisfactory market cannot be developed. In other words, the lack of supply prevents a general marketing and distributing plan. Perhaps this is true, but as long as the beekeepers continue to work individually and sell honey at prices below actual cost of production, it will be impossible to get a sufficient number of large beekeepers to remain in the business.

Lack of standardization in grades and packages has also helped greatly to keep the honey market demoralized. This situation, however, is being gradually improved, and a number of states have well established grading laws for honey. The effect of this has been to greatly increase production and to improve the situation in general throughout the entire country. Each individual beekeeper who reads this article will help himself and his neighbor beekeeper if he will figure out just what it costs him to produce his honey. Then co-operate with the beekeepers in your district or county in getting all of these reports together to figure out cost of production and establish a price which will bring you a fair market return.